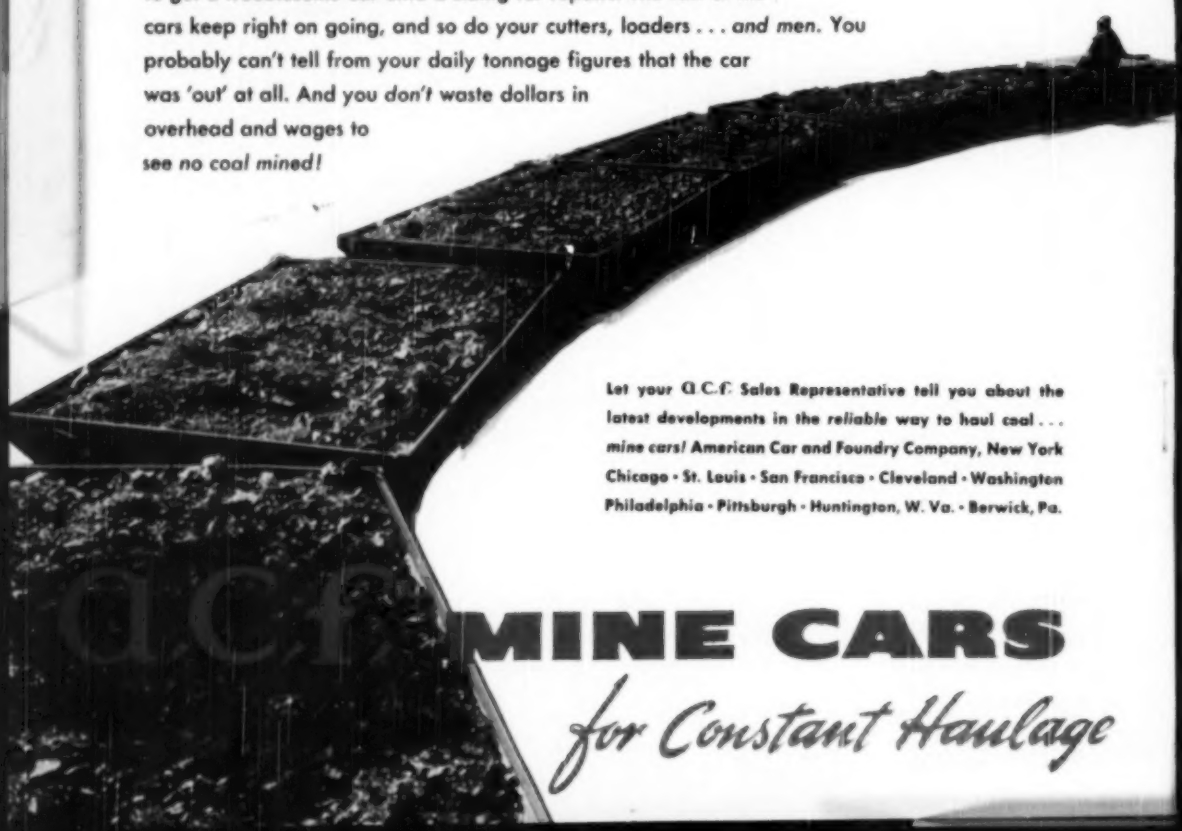
Coal Age

The Miner and Safety ... p 62

NO SERIOUS HAULAGE DELAYS WITH MINE CARS!

You'll never see your mine's entire coal hauling system broken down for hours or even minutes... if you use mine cars!

The most expensive sight ever seen in any mine is men and machines standing idle . . . waiting for a coal hauling system to be fixed. It actually happens . . . *but not to mine cars!* It only takes a few minutes to get a troublesome car onto a siding for repairs. The rest of the cars keep right on going, and so do your cutters, loaders . . . *and men.* You probably can't tell from your daily tonnage figures that the car was 'out' at all. And you *don't* waste dollars in overhead and wages to see *no coal mined!*

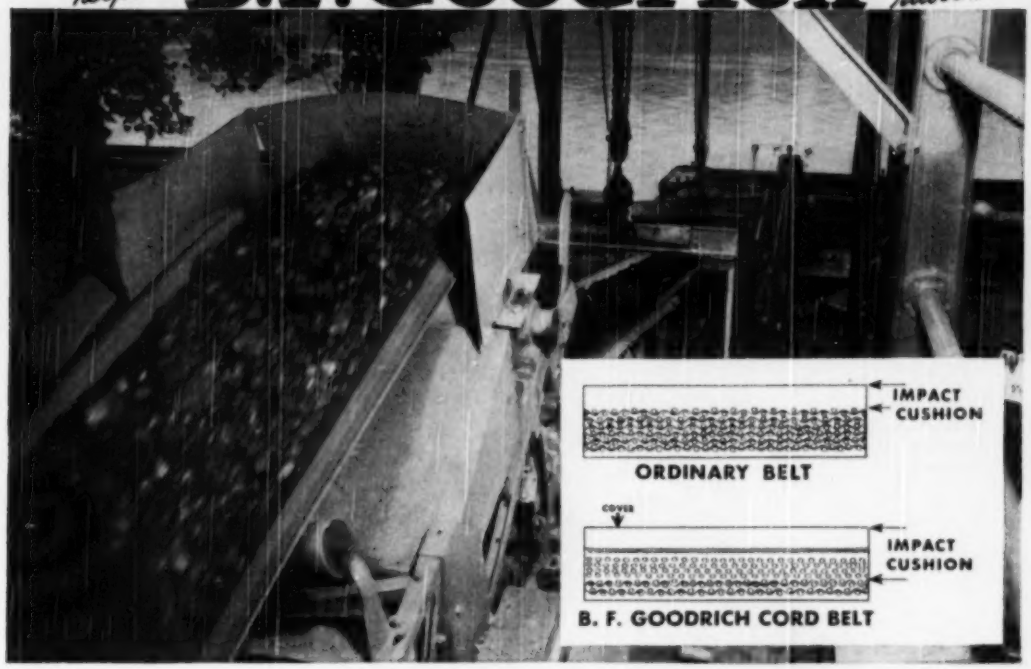


Let your A.C.F. Sales Representative tell you about the latest developments in the *reliable* way to haul coal . . . *mine cars!* American Car and Foundry Company, New York Chicago • St. Louis • San Francisco • Cleveland • Washington Philadelphia • Pittsburgh • Huntington, W. Va. • Berwick, Pa.

acf MINE CARS

for Constant Haulage

Research keeps **B.F.Goodrich** *first in rubber*



Cord belt stands rushing grit; lasts 5 times longer than previous belts

B. F. Goodrich belt saves 50 man-days of labor in track-to-river installation

THE coal here travels from freight cars to river barges, riding the length of one belt, dropping six feet to the next, and so on down the "staircase". The stream of pulverized coal is constant, speed of the belt is usually 450 feet per minute, carrying about 450 short tons per hour, 500,000 tons a year.

Ordinary belts wore out in a year, sometimes sooner. B. F. Goodrich Cord belts were installed. The oldest is still in service after 5 years, delivering 2,500,000 tons, as against 500,000 for ordinary belts. At least 50 man-days of labor have been saved—time that would have been spent repairing and replacing ordinary belts. Here's why the B. F. Goodrich Cord belts give this kind of service:

Impact Resistance—Each lengthwise cord is completely surrounded and cushioned by rubber; all the rubber forms one connected mass. This rubber-borne cord body has virtually the same impact resistance as the cover itself. Cords are free to "give" when impact occurs. It distorts temporarily, distributing and absorbing a shock that would damage stiff unyielding plies. In addition to the regular cord body, B. F. Goodrich has added a patented *Transcord Breaker*—an *extra* layer of parallel cords in rubber, placed across belt width. Acts as a shock absorber; stretches to prevent gouges and cuts from splitting belt cover. B. F. Goodrich Cord belt has 2 to 6 times the impact resistance of ordinary belts.

Troughing—There being no crossweave in the cord plies, cords are free to flex, conform to idlers, pulleys. No spillage. Troughs naturally even when running empty.

Adhesion—Ply separation in a B. F. Goodrich Cord belt is practically impossible. Rubber-surrounded cords make one integral piece of rubber.

Moisture and Acid Resistance—Cords are twisted tighter than ordinary yarn, not susceptible to moisture. Rubber-surrounded cords keep out air, dampness, prevent mildew.

The first B. F. Goodrich Cord belt ever made is still on the job after 12 years and over 14 million tons of rough-riding coal. If you're looking for similar savings in coal-hauling, call in your local BFG distributor, or write *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Conveyor Belts BY
B.F.Goodrich

The Champion

"TOWERING MONARCH OF HIS MIGHTY RACE"

Drawn from a Barnum Circus Poster

Elephants come and elephants go—but since P. T. Barnum exhibited his monstrous elephant in New York City in 1882 the name JUMBO is still used to denote the BIGGEST of its kind. JUMBO, born in Africa, was kept at the London Zoo until America's premier showman bought him for $10,000 and shipped him to New York over the protests of the British nation. The great pachyderm weighed 6 tons, stood 11 ft. 6 inches high, and was in his time—and still is—the Champion...the best known elephant in the world! It took a railroad train in Canada to kill the giant beast; and to this day visitors to the Smithsonian Institution in Washington, D.C. gaze in awe at the towering skeleton.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

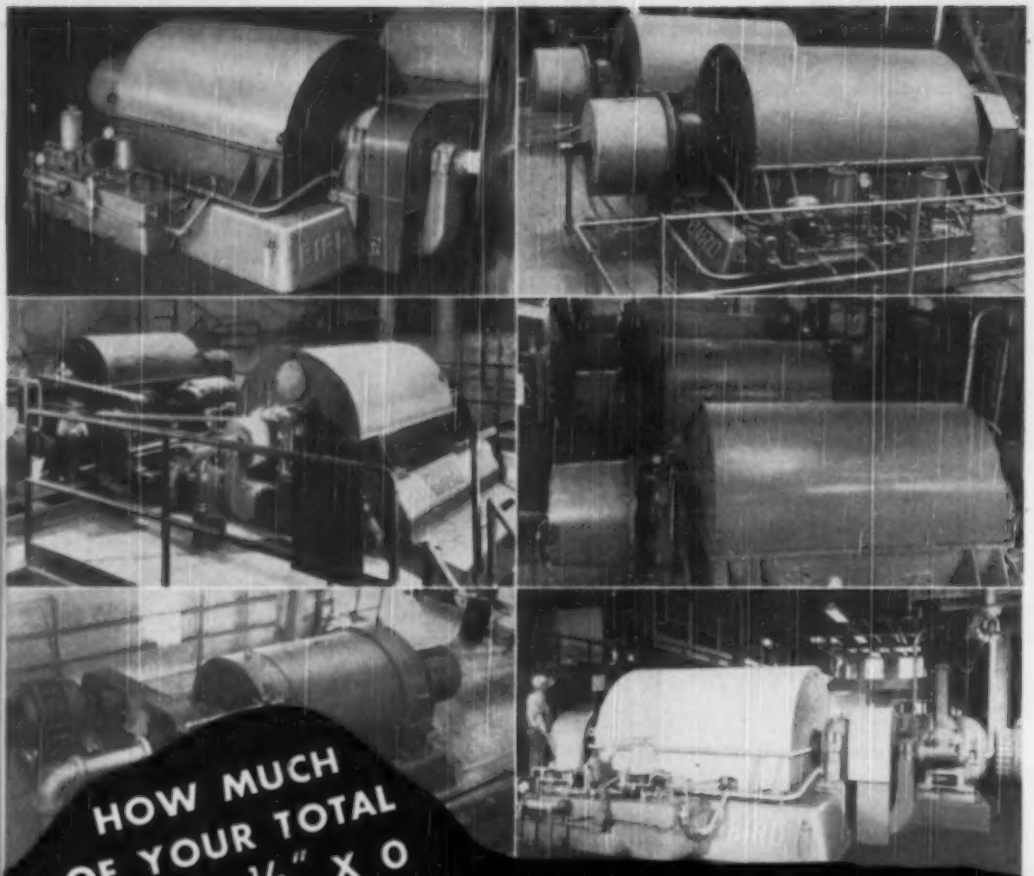
The Champion

...IN COAL MINE LUBRICATION

Hulburt Quality GREASE

"The Champion"

Ever since Hulburt Grease was first used on Coal Mining Machinery, the name HULBURT has meant the BEST Quality Grease for the one work it is made to do — which is the right kind of a lubricating job all through your coal mine. You've got worse than a white elephant on your hands when faulty lubrication causes mining machinery to slow up or stop . . . You've got a dead loss in time, money, production. So remember, it won't cost you $10,000 or even $1.00 to have a Hulburt Lubrication Engineer go down into your mine and tell you what's wrong — and how to use Hulburt Grease to make things run right. Emulate the elephant — don't forget — send for a Hulburt Man today.



HOW MUCH OF YOUR TOTAL TAKE IS 1/4" X 0 ?

AND WHAT ARE YOU DOING TO DRY IT?

Wash that big daily tonnage of fine coal any way you like, but use BIRD FILTERS to dry it.

Here's why a hundred BIRD COAL FILTERS are already on the job:

- BIRDS make possible a 100% closed water system.
- The washed fine coal comes direct to the BIRD, gets dried and goes direct to the cars or to thermal dryers.
- The BIRD runs continuously for months without shutdowns for maintenance or overhaul.

Don't delay. Now is the time to start doing a better job of handling that fine coal. BIRDS quickly pay for themselves. Write for Bulletin.

BIRD MACHINE COMPANY · SOUTH WALPOLE, MASSACHUSETTS

The BIRD

Continuous Centrifugal COAL FILTER

THIS MONTH'S COVER

AIR-BREAKING is one of the modern tools employed to achieve high efficiency at the Regent mine of the Linton-Summit Coal Co., in Indiana. For the complete story on Regent's mechanical-mining program, see p 70 of this issue of COAL AGE.

LOOK FOR THESE

ALSO SCHEDULED for early publication, primarily in June, are these from the Coal Age line-up of significant and helpful articles:

- **Grassroots public relations**—how they can be attained and what they mean to mining progress.
- **How the airplane** can promote stripping efficiency.
- **Planning** and operation of anthracite's newest colliery.
- **Wooden roof pins**—design, use and results in service.

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Volume 55 Number 5

A McGRAW-HILL PUBLICATION

EASIER STARTS- LOWER COSTS

When mine car wheels are lubricated with TEXACO OLYMPIAN GREASE

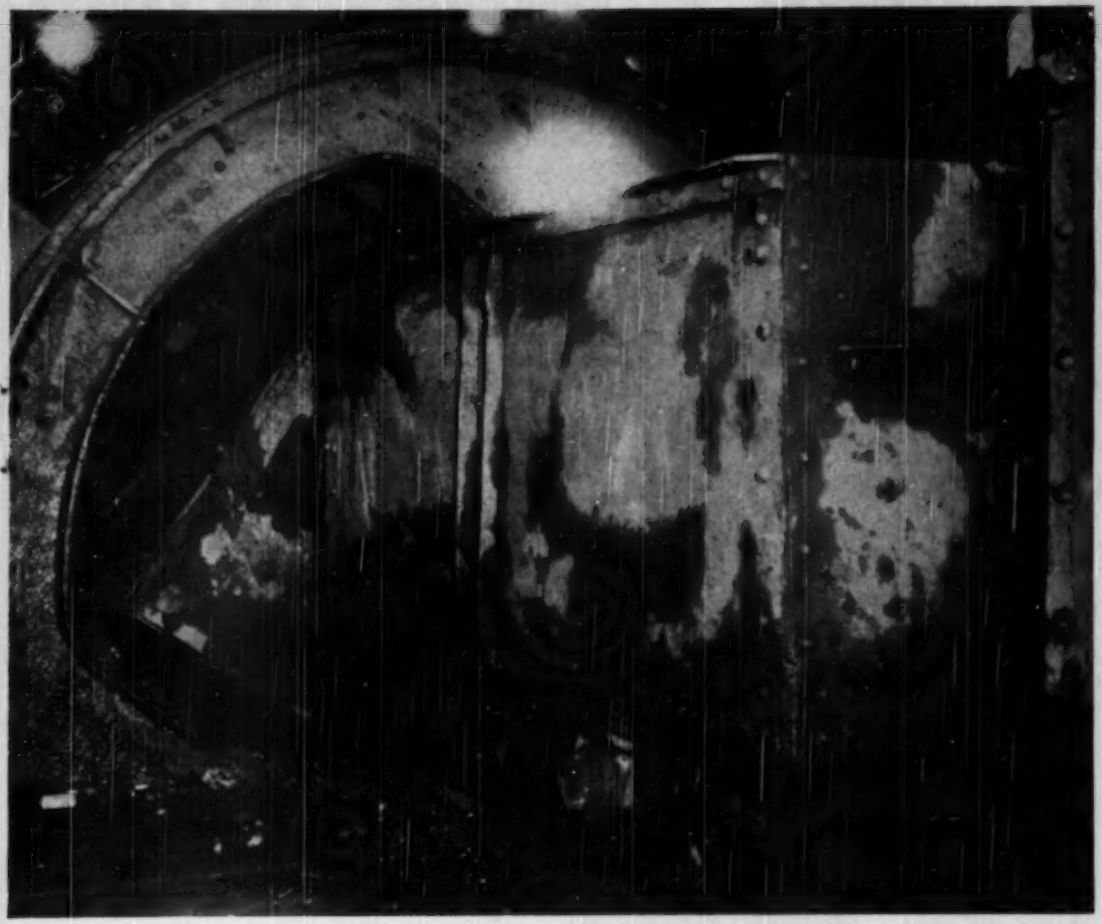
YOU can use *Texaco Olympian Grease* the year around. Its long-lasting, protective lubricating qualities, its low starting and running torque, are not affected by seasonal temperature changes. It *stays in* the bearings in summer, assures easier starts for trains in winter.

Texaco Olympian Grease is made in three consistencies especially for mine car

TUNE IN . . .
TEXACO STAR THEATER
starring
MILTON BERLE
on television
every Tuesday night.
See newspaper for
time and station.

TEXACO

TEXACO LUBRICANTS



service. It has high resistance to oxidation and will not separate . . . seals out dirt and moisture. This assures greater protection for bearings (plain, cavity hub, or anti-friction) . . . reduces maintenance costs materially.

To reduce maintenance costs of hydraulic equipment, use *Texaco Regal Oils (R & O)*. This turbine-grade oil is made to prevent rust, sludge and foam . . . keep operation smooth and trouble-free.

A Texaco Lubrication Engineer will gladly help you reduce operating and maintenance costs. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

Horner and Switzer

move 220,000 with 3 rear-dump

On this mountainous highway job, Tournarocker's quick, easy maneuvering cut important seconds off every haul cycle. Ability of the 2-wheel prime mover to make 90° turns gives the big Tournarocker a short turning radius of 12'6" . . . and it really paid off here.

220,000 yards of mountain-top granite . . . altitudes up to 8300 feet . . . narrow, precipitous haul trails . . . and continual heavy rains, almost every other day. Those were the conditions which Contractors Horner & Switzer tackled on relocation of U. S. Hwy. 280, from Granby Dam to Monarch Lake, Colorado. They drove in a fleet of 3 LeTourneau rear-dump Tournarockers, teamed them up with a 2½-yard rock shovel, and got the following big-yardage results:

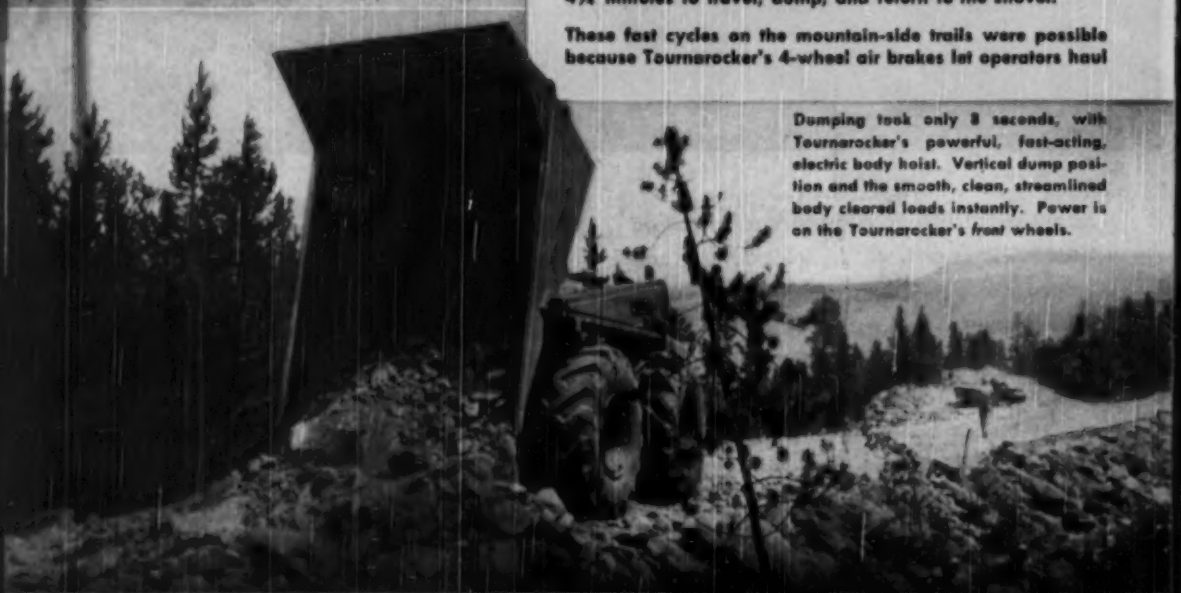
Averaged 10½ bank yds. per load

Contractor's crew estimated the rock wagons carried 10½ bank yards of granite each trip. They were loaded in an average of 7 passes from the 2½-yard dipper. In extreme hard digging, it often took the shovel 4½ minutes to load each rig. Haul cycles were so fast that on most haul distances only 2 of the Tournarockers were needed to keep the shovel busy. For example:

1240' haul, dump, return in 4¼ min.

Hauls on the job ranged from a few feet up to a half-mile. Checked on a 1240-foot, one-way haul, including a 170-foot stretch of 13% adverse grade, each Tournarocker took only 4¼ minutes to travel, dump, and return to the shovel.

These fast cycles on the mountain-side trails were possible because Tournarocker's 4-wheel air brakes let operators haul



Dumping took only 8 seconds, with Tournarocker's powerful, fast-acting, electric body hoist. Vertical dump position and the smooth, clean, streamlined body cleared loads instantly. Power is on the Tournarocker's *front* wheels.

LETOURNEAU PEORIA, ILLINOIS **TOURNAROCKERS**

TRACTION ADVANTAGES of A CRAWLER PLUS HIGH-SPEED on RUBBER

Yds. MOUNTAIN GRANITE
TOURNAROCKERS

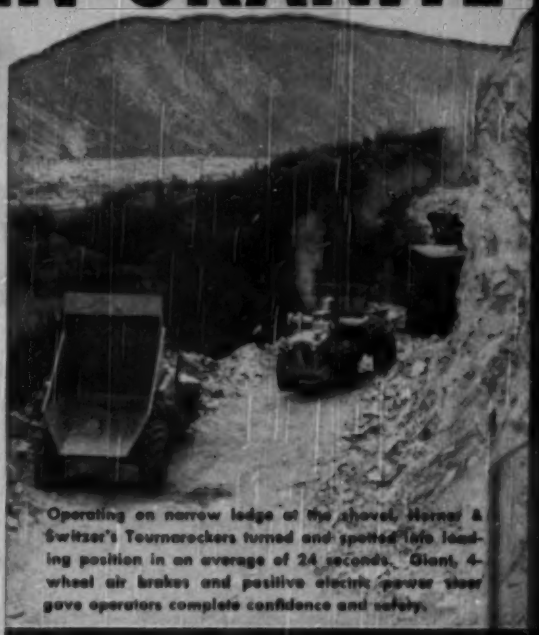
heavy loads at maximum speeds with complete safety. 4,108 square inches of braking surface . . . more on one wheel than most haulers have on all four wheels . . . gave sure, safe stops every time. Short, 90° turns, and positive electric steer by push-button control, permitted quick turning and spotting on the dump and at the shovel.

8-second dump

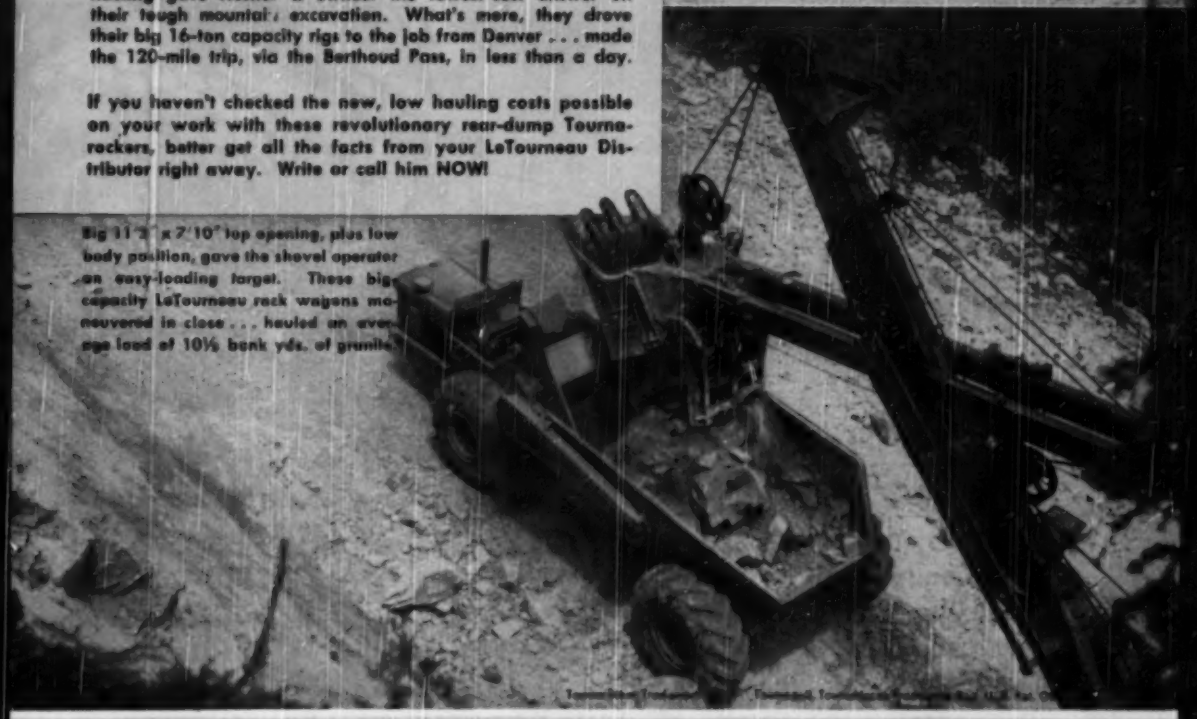
Dump was fast . . . simple, electric body hoist tilted the wide, streamlined body to vertical position . . . cleared the 10½-yard loads in just 8 seconds, total hoist and dump time. Because of their front-wheel drive, and holding action of powerful 4-wheel brakes, the Tournarockers safely backed up to edge of bank, and dumped loads over the bank eliminating rehandling . . . saving dozer clean-up.

All these Tournarocker advantages for big-payload, fast-cycle hauling gave Horner & Switzer the lowest-cost answer on their tough mountain excavation. What's more, they drove their big 16-ton capacity rigs to the job from Denver . . . made the 120-mile trip, via the Berthoud Pass, in less than a day.

If you haven't checked the new, low hauling costs possible on your work with these revolutionary rear-dump Tournarockers, better get all the facts from your LeTourneau Distributor right away. Write or call him NOW!



Operating on narrow ledge at the shovel, Horner & Switzer's Tournarockers turned and spotted into loading position in an average of 24 seconds. Giant, 4-wheel air brakes and positive electric power steer gave operators complete confidence and safety.



Big 11'2" x 7'10" top opening, plus low body position, gave the shovel operator an easy-loading target. These big-capacity LeTourneau rock wagons maneuvered in close . . . hauled an average load of 10½ bank yds. of granite.

Tournarock Trademark . . . Tournapull, Tournadozer, Tournapower Reg. U.S. Pat. Off.

Send Today for complete facts to R. G. LeTOURNEAU, Inc., Peoria, Ill.

We're interested in . . . ☐ specifications ☐ price ☐ job analysis on the 16-ton, rear-dump, R16 Tournarocker

NAME..... TITLE.....

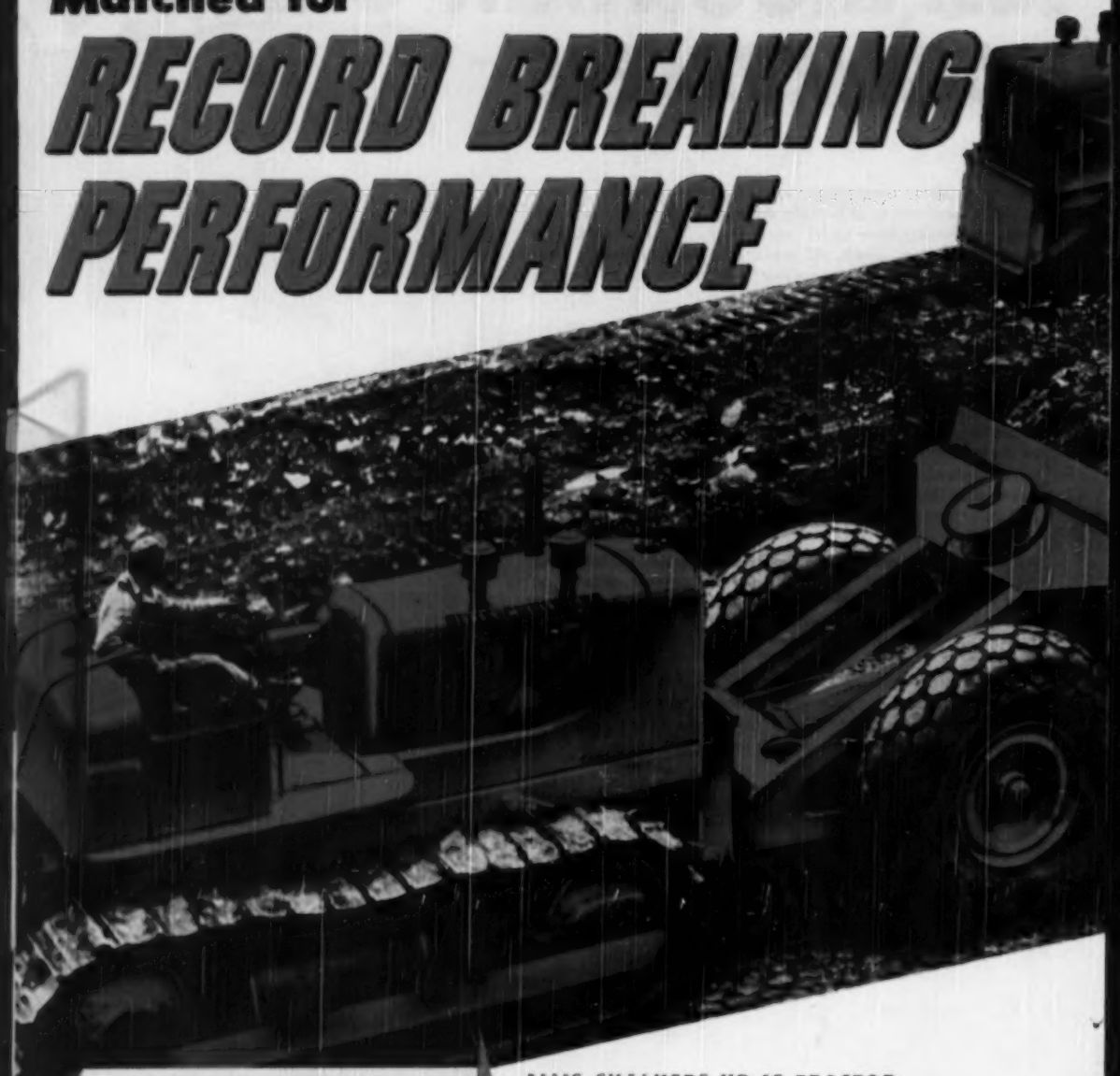
COMPANY..... TYPE OF BUSINESS.....

STREET..... CITY..... STATE.....

Would also like information on ☐ 13.5-yard C Tournapull ☐ 7-yard D Tournapull ☐ rubber-tired Super C Tournadozer

LeTOURNEAU LET EQUIPMENT

Matched for RECORD BREAKING PERFORMANCE



A rugged, tough combination — built to give you bigger output at lowest possible cost per yard . . . under all operating conditions

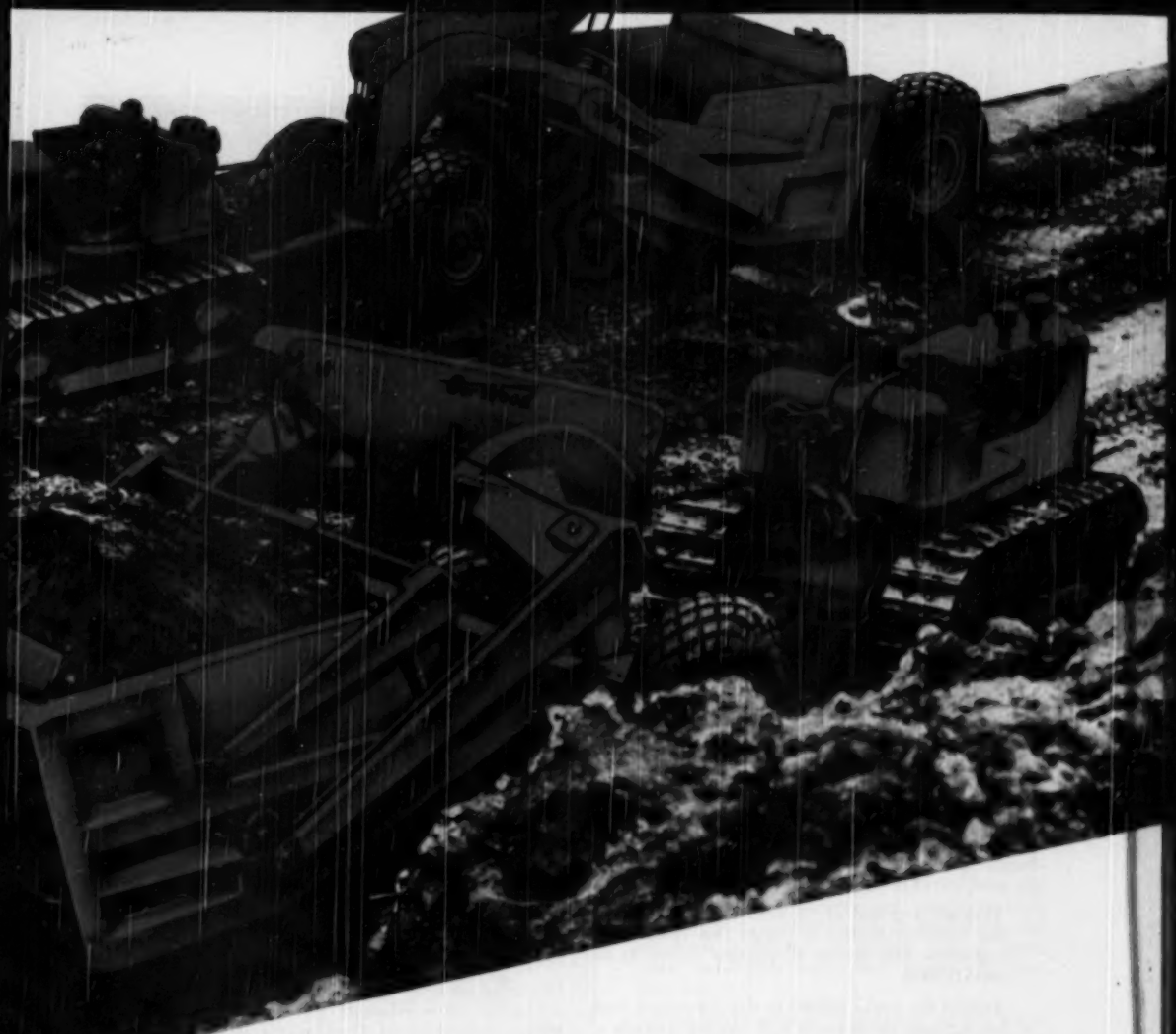
ALLIS-CHALMERS HD-19 TRACTOR

- 40,000 lb.
- 163 hp. at flywheel.
- More traction, more ground contact, better balance.
- Hydraulic torque converter drive — eliminates most shifting, provides smooth, cushioned performance.
- Infinite number of speeds in only two gear ranges — 0 to 3 mph. in low and 0 to 7 in high.
- Simplified servicing and maintenance . . . reduced lubrication . . . easier operation.

GAR WOOD 625 SCRAPER

- 24.5 cu. yd. heaped capacity; 19.2 cu. yd. struck capacity.
- Open bowl design.
- Forced, controlled ejection.
- High clearance and low center of gravity.
- Extra strength throughout — plenty of beef where needed.
- Exceptionally wide apron opening.
- Live boiling action that distributes dirt into both bowl and apron.
- Large tires for greater flotation.

"Seeing is Believing." Ask your Allis-Chalmers Dealer for a Demonstration.



NOW! **completely new easy, loading and dumping GAR WOOD MODEL 625 SCRAPER . . . built to take full advantage of the greater working ability of the big, powerful, smooth operating ALLIS-CHALMERS HD-19 Hydraulic Torque Converter Tractor**

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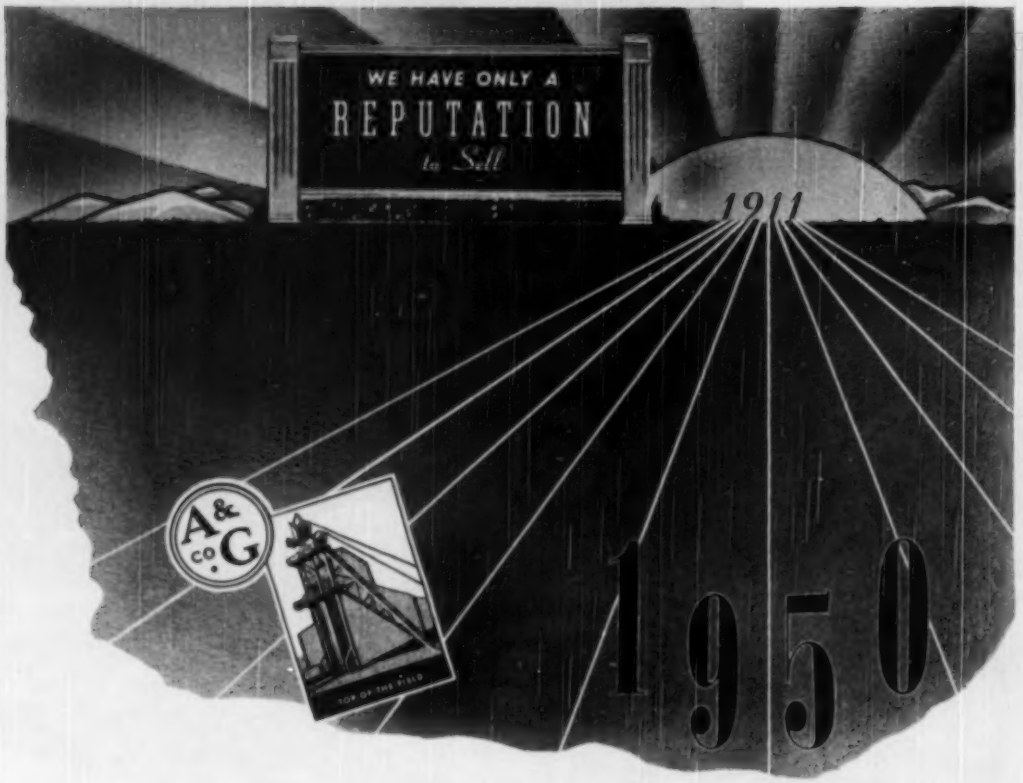
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Originator of the Torque Converter Tractor

FOR GREATER PRODUCTION . . . FOR EASIER OPERATION . . . FOR SIMPLIFIED SERVICING.



Through a period of 39 years, this organization has operated strictly as design and construction engineers, with almost all projects limited to the mining field.

Around the world activity in this specialized work has brought us in touch with mining methods of all kinds. A&G engineers have had the opportunity, therefore, of working under a variety of conditions.

As evidenced by repeat assignments, A&G engineers have always advanced the most modern in physical structures and in methods. The needs of the times were fully met and ample provision made so that all immediate economies realized carried on through the years.

A&G, being exclusively an engineering organization, has no machinery to sell. Our equipment recommendations are made to suit the particular production problems, and purchases made from various sources accordingly.

Thus, through a long and successful career, we have earned a reputation which we greatly value and will protect. It is the only thing we have to sell.

Operating on a cost and fee basis has proved advantageous in a financial way to all operators whom we have served. Cost being a variable may go up or down in accordance with market prices.

This however has never been a serious consideration over original figuring. Our fee plan can give you one of two arrangements—one as fixed at time of contract—one on a small percentage basis, going up or down as based on final costs.

In every case, this organization can save you money in new structures as well as in revamping old ones—the modern results we achieve will cut your production costs materially.

When you are ready let us know and we will contact you.

ALLEN & GARCIA COMPANY

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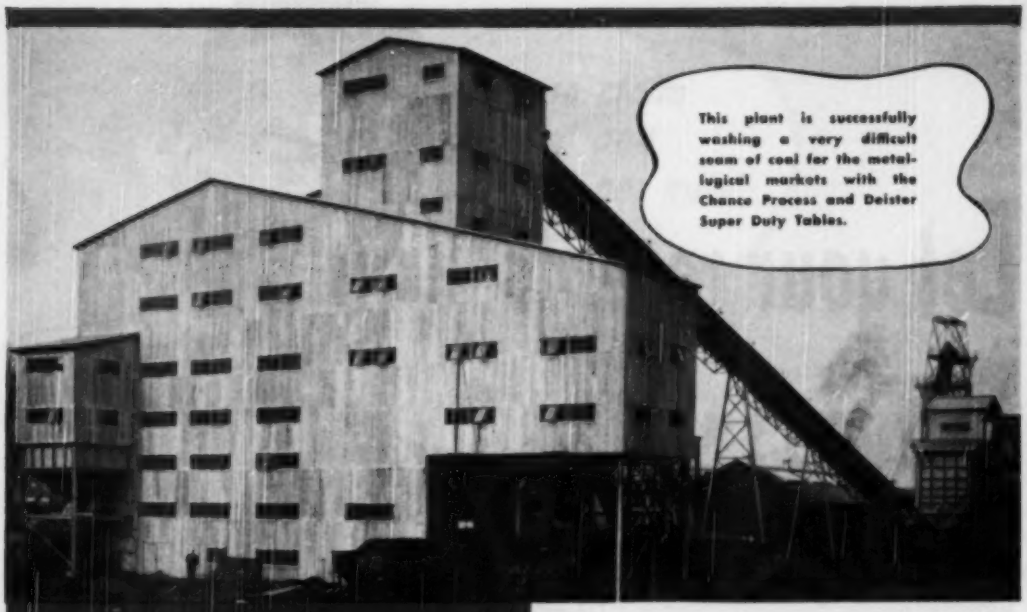

This plant is successfully washing a very difficult seam of coal for the metallurgical markets with the Chance Process and Deister Super Duty Tables.

COKE, GAS, & CHEMICALS

provide a huge market

for PREMIUM COAL

★

108,196,000

TONS IN 1948

• It requires scientific preparation to produce "metallurgical coal" that can be converted with minimum loss into highest quality coke.

Fairmont designs and builds complete preparation systems—Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning. Either of these preparation methods produce coal of uniformly high chemical and physical properties to enable you to compete favorably for your share of this market.

Consult a Fairmont Engineer on the type of equipment required to meet the needs of your particular market.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning

Let your records tell you!

It's no news that the true cost of wire rope cannot be reckoned by purchase price alone. As we've so often pointed out, the real cost is the cost per unit of work it does.

In the case of Bethlehem rope, this figure will be *low*, and you will therefore have an economical rope. But we strongly suggest that *you* prove this to your own satisfaction. Keep some simple records; something to show, for instance, the rope costs per ton-mile in oil-country drilling . . . or per car of coal hauled up a slope . . . or per cubic yard of rock moved, etc. Pick the most convenient unit of work applicable to your business. It isn't at all difficult or complicated.

Then, study your records every so often. They'll tell you, far more convincingly than we can, that Bethlehem wire rope is an *economical* rope.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

Anybody can claim "longer life" and "lower cost per mile" for tires...
But Goodyear proves it by the fact that more tons are hauled on Goodyear tires than on any other kind!
TWO GREAT TIRES FOR COAL HAULING

ROAD LUG

For trucks that operate both OFF and ON the road, this dual-purpose tire is best. Tough construction and special tread design provide super-traction off the road—more mileage on the road.

HARD ROCK LUG

For tire-bruising, heavy-duty off-the-road work this super-rugged tire is tops. Its tough armored carcass and extra-husky lugs assure more wear, better performance no matter how tough the going is.

That's why, to cut your costs, always BUY and SPECIFY Goodyear tires—it pays! They're FIRST because they're BEST!

GOODYEAR

Road Lug—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

For power, for value, for every job
THEY'RE GREATER THAN EVER

Year after year the nation's truck users buy more Chevrolet trucks than any other make. For every kind of trucking job they prefer Chevrolet power and Chevrolet value.

Now, Chevrolet's two rugged valve-in-head engines give more power than ever. Advance design, solid construction and low prices give Chevrolet more value than ever.

Prove it to yourself. See the new Chevrolet P·L Trucks. Check them for popularity, performance, payload and price. In 1950 they are more than ever America's best truck buy!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICH.

LEADING WITH ALL THESE PLUS FEATURES:

• TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Load-Master and the Improved 92-h.p. Thrift-Master—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.

CHEVROLET

P·L

ADVANCE-DESIGN TRUCKS

Popularity Leaders Chevrolet trucks outsell all others. In every postwar year truck users have bought more Chevrolets than any other make—proof of the owner satisfaction they have earned throughout the years.

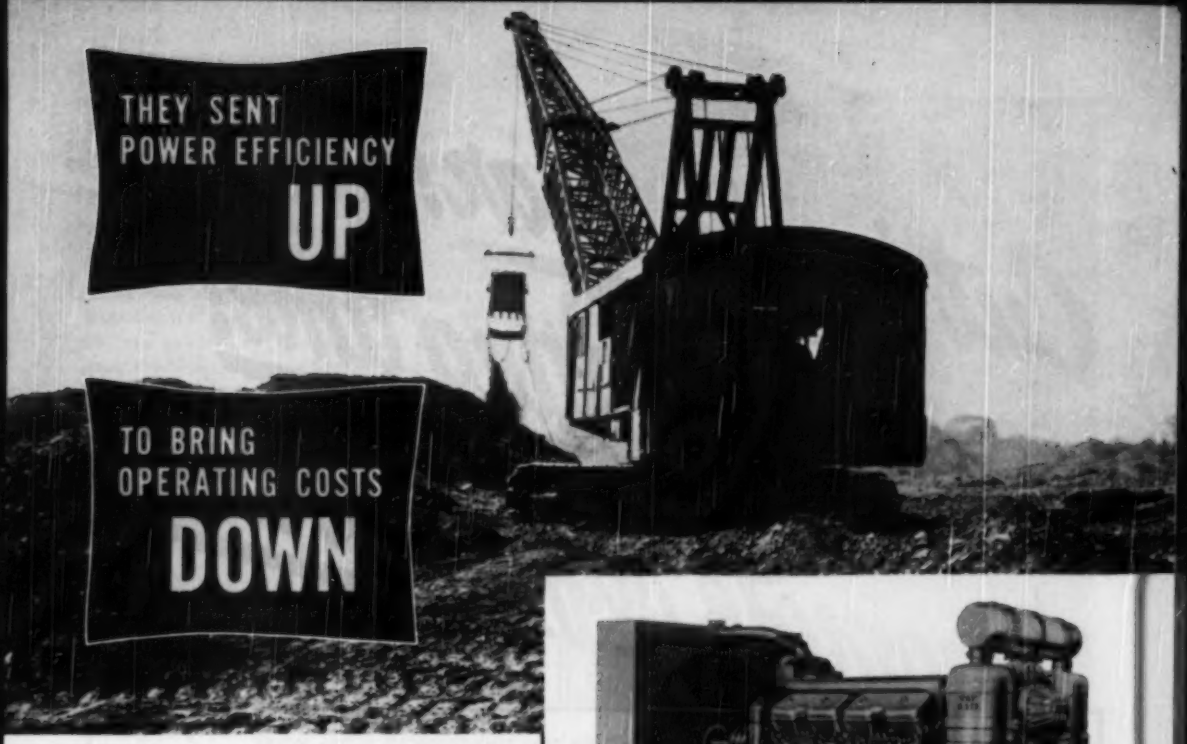
Performance Leaders The new Chevrolet P·L trucks give you high pulling power over a wide range of usable road speeds—and on the straightaway, high acceleration to cut down total trip time.

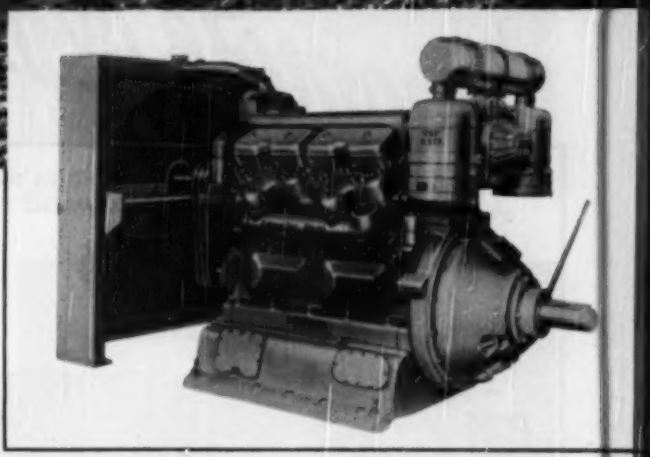
Payload Leaders The rugged construction and all-around economy of Chevrolet P·L trucks cut operating and repair costs—let you deliver the goods with real reductions in cost per ton per mile.

Price Leaders From low selling price to high resale value, you're money ahead with Chevrolet trucks. Chevrolet's rock-bottom initial cost—outstandingly low cost of operation and upkeep—and high trade-in value, all add up to the lowest price for you.

THEY SENT POWER EFFICIENCY UP

TO BRING OPERATING COSTS DOWN





THERE may be other ways of stripping cost wastes from stripping operations, but the Nanticoke (Pa.) Excavating Company went to the bottom of things to find the *best* way. . . . They came up with the decision to put a new power unit into their big P. & H. dragline. A powerful "Cat" D375 (318 hp. with radiator fan as illustrated) was chosen.

Up went efficiency. Down went fuel and other operating costs. With power to spare, the heaviest bucketful now speeds through without engine-labor slow-up. And with the dependability and long life that are typical of "Caterpillar" products, the unit can be expected to be doing its daily stint long after depreciation charge-offs have wiped its purchase price off the books.

Are *you* doing something about combating climbing operating costs with lower power costs? Your "Caterpillar" dealer can give you helpful facts-and-figures. Drop in to see him.

NOTE—*The Nanticoke Excavating Company also owns three "Caterpillar" D8 Tractors, two D17000 Engines, a D13000 Electric Set and two D311s.*

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

LOOK UNDER THE HIDE

"Caterpillar" precision-built cylinder liners are made of heat-treated alloy iron. Molybdenum is used for refinement and increased liner strength, nickel for uniform structure, and chromium for wear and corrosion resistance. Liners are "Hi-Electro" hardened to give long life. The wearing surface is so hard it must be ground, not machined with a cutting tool. All liners are chemically treated, to provide uniform break-in without scuffing and scratching. Look under the hide for quality and long life.

CATERPILLAR

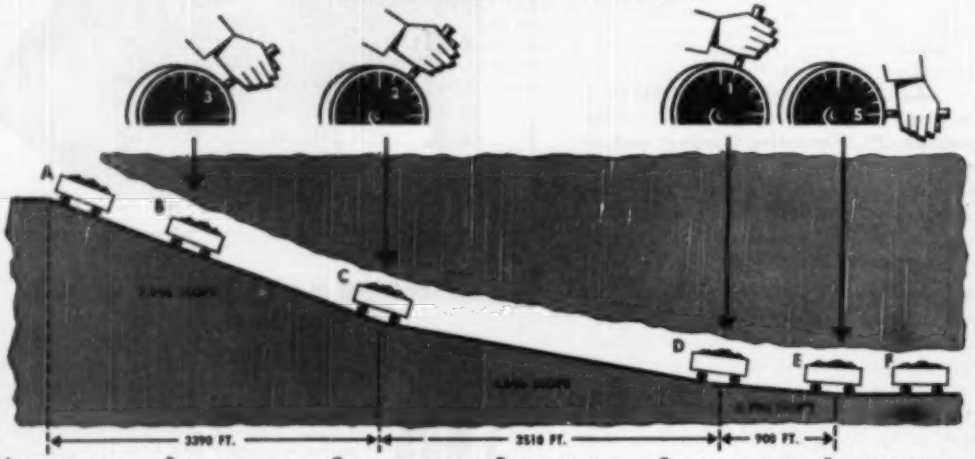
REG. U. S. PAT. OFF.

DIESEL

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Cut brake wear!
Save spotting time!
Promote safe lowering!

HOW DYNAMIC BRAKING HOLDS THIS UNBALANCED SLOPE HOIST TO APPROXIMATELY 40% FULL SPEED



A At start, car is lowered by gravity and allowed to accelerate to 40% full speed.

B Dynamic braking is then applied in order to prevent speed increase.

C Because of slope change, only approximately 25% braking torque is required to hold speed.

D Electric braking is further decreased to about 13% to correspond with reduced pitch of track.

E At bottom, 100% braking torque is applied to decelerate to low speed for spotting.

F Mechanical brakes are applied only at end of trip to spot and hold cars.

To provide allowable man-trip speed while lowering, 40% of the full rated speed of 1200 fpm is desired over the 7800-foot length of travel. Using dynamic braking to obtain this desired speed, the operator watches his electric rope-speed indicator and simply moves his master switch to the points of braking required. Thus the speed is held in good control.

GENERAL ELECTRIC

663-6

General Electric a-c mine-hoist drive in this unbalanced-slope installation uses d-c dynamic braking control to give these advantages in reduced-speed lowering

To increase hauling capacity, the operators of a West-Central Pennsylvania mine recently installed a co-ordinated General Electric a-c mine-hoist drive. Replacing a smaller one, the new drive has boosted payload capacity to 95 tons per trip—330 tons per hour!

But that's not all! Use of d-c dynamic braking to control the hoist motor during reduced-speed lowering also provides these advantages:

Safety promoted! Lowering man-and-material trips are made at safe, uniform speeds, without jerking.

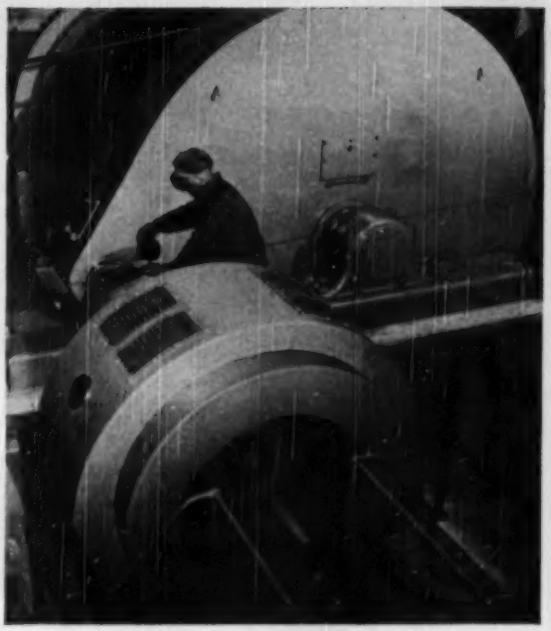
Maintenance costs cut! Mechanical brakes are used only to hold trip at its destination and for final stopping after retarding to low speed with dynamic braking—thus lessening strain and wear on brake wheels and linings.

Spotting time reduced! Control of low-speed lowering permits spotting, landing, and dropping trips into partings with minimum delay.

Economy! Simplicity! Reliability!

G-E induction-motor mine-hoist drives combine the advantages of low first cost and upkeep, simple installation and operation, high efficiency, and rugged reliability. That's why over 800 are now in service, helping to step up mine production and cut hoisting costs.

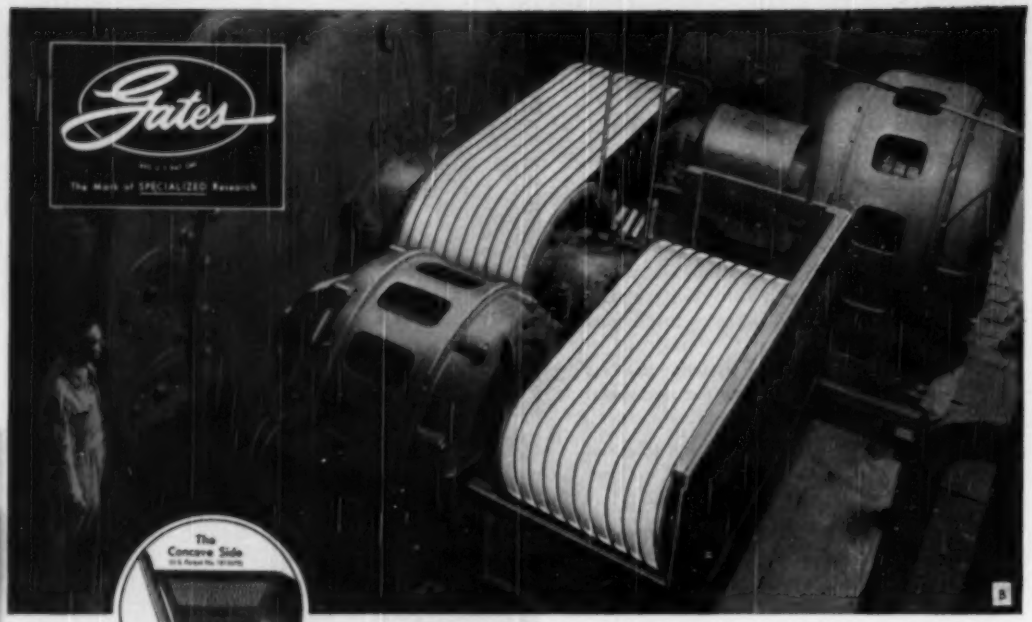
For experienced help on mine-hoist drives and other electric equipment to cut mining costs, it will pay you to call in a G-E mining specialist. Phone him at your nearest G-E office. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*



Typical of hundreds of others is the G-E 800-hp wound-rotor induction motor geared to the hoist at this mine. In ratings from 50 to 3500 hp, these motors offer the simplest way to obtain the advantages of electric drive for mine hoists.

G-E control and protective equipment, located in the hoist house conveniently near motor and drum, provides full magnetic reversing d-c dynamic braking control of the hoist motor and protection of machines and power system.

Mine-Hoist Drives
...to cut mining costs!



The motor in the background transmits 600 horsepower through a hollow shaft to one impeller of this crusher while the motor in the foreground transmits 400 horsepower to the other impeller turning it in the opposite direction. The Gates Vulco Ropes absorb the terrific shocks encountered when hard copper ores are crushed between these impellers—are not bothered by the dust condition present.

Here is exactly *WHY* the Concave Side Saves You Money in V-Belt Costs

When *any* V-belt bends in going around its pulley, it is forced to *change* its *shape*.

Naturally so, because the top of the belt is under tension and grows *narrower* while the body, under compression, *bulges out!*

This change of shape in a *straight-sided* V-Belt, is shown in figures 1 and 1-A—and you will note how the bulging sides press *unevenly* against the V-pulley.

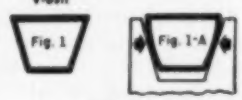
Now look at figures 2 and 2-A. There you see how this change of shape, due to bending, affects the belt that is built with the Concave Side—the Gates Vulco Rope. The precisely engineered Concave Side exactly corrects the side-bulge—and the bent belt *has a shape that exactly fits its sheave groove!*

Two distinct savings result. *First*—There is no side-bulge to cause uneven wear. The sides press *evenly* against the V pulley and therefore wear *uniformly*—resulting in *longer life!* Second—The *full width* of the sidewall grips the pulley—thus carrying heavier loads without slippage—and this *saves belts* and also saves *power!*

When you buy V-Belts, be sure you get the V-Belt with the Concave Sides... the Gates Vulco Rope!

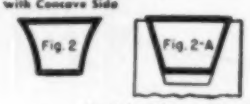
What Happens When a V-Belt Bends

Straight-Sided V-Belt



How Straight Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear at Point Shown By Arrows.

Gates Vulco Rope with Concave Side



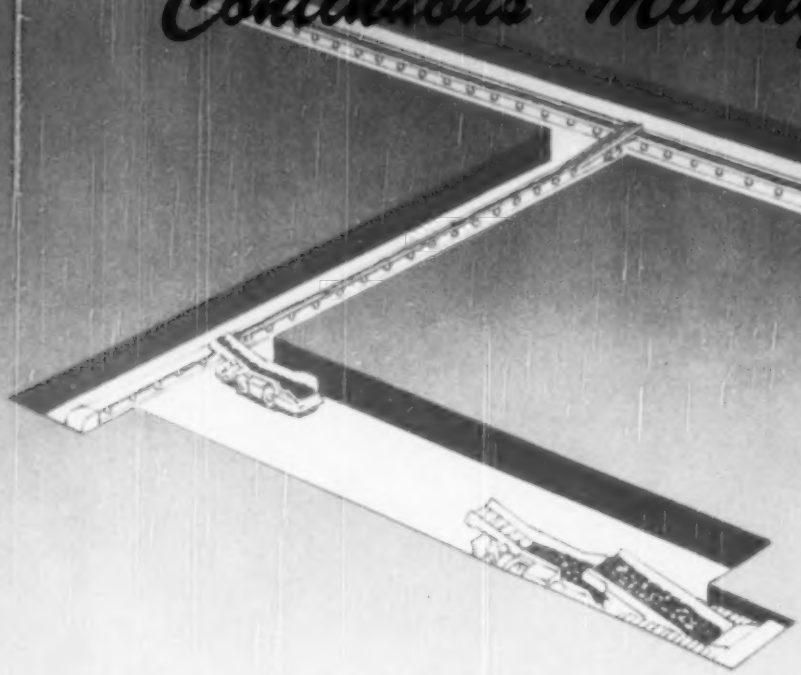
No Side Bulge. Precise Fit in Sheave Groove. Sides Press Evenly Against V-Pulley—Uniform Wear—Longer Life!

CS-505

THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

A Triple Play In Continuous Mining

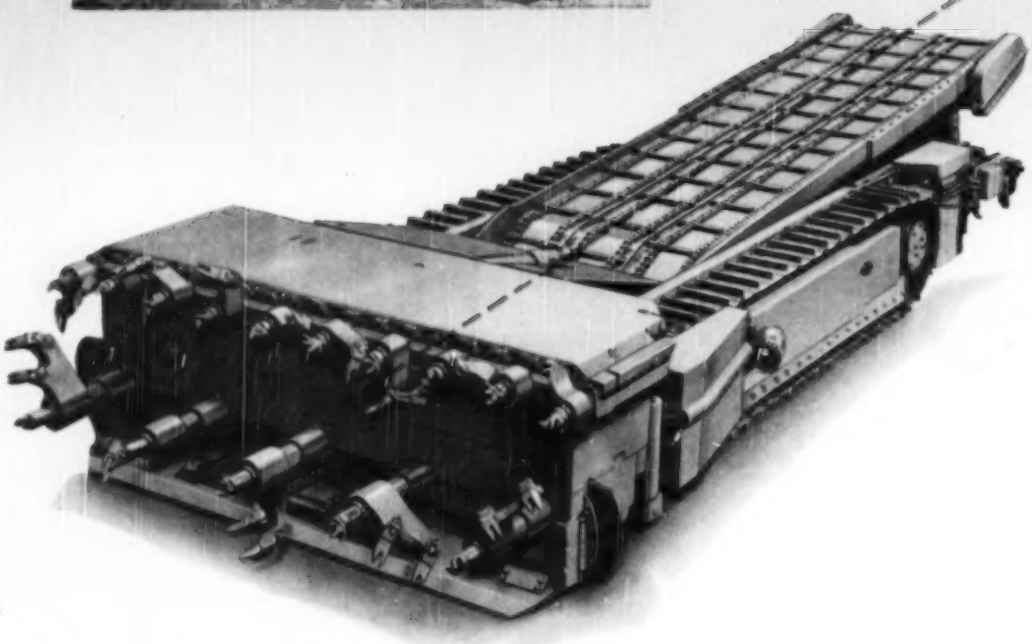


Play Ball! A great team is in the field — eager to match strength against high production costs — ready to knock out tonnage at the rate of 3 to 5 tons per minute. As drawing indicates this team is made up of the one-process device — the COLMOL; one or more Shuttle Cars; and a Chain or Belt Conveyor (or both). No pinch hitters needed and that means Cutting, Drilling, Shooting and Loading sit on the bench while the BIG THREE is in there pitching (every minute). The game is on . . it's not too late to get your ticket for a ride on the continuous-mining train and see for yourself

JM

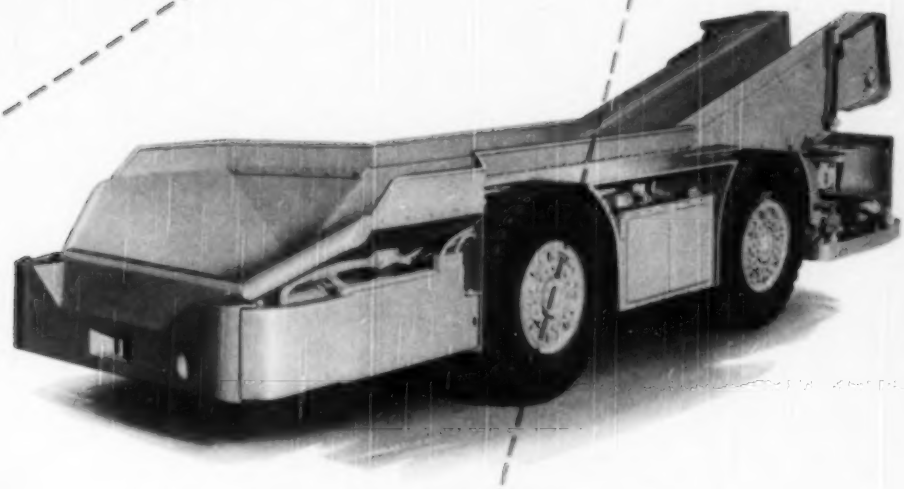
A GREAT ADVANCE IN MECHANIZATION

COLMOL TO . . . SH

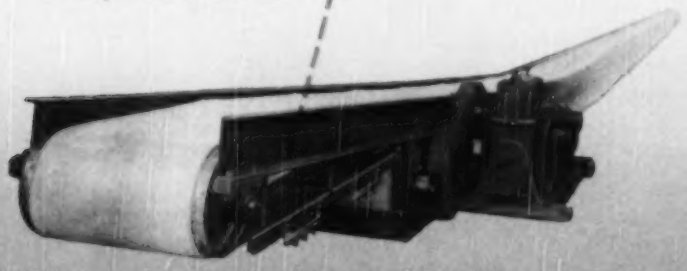


View at top of page shows the mining action of the COLMOL breaker arms as they contact the face. Also note the clean, uniform walls, floor and roof. Outlined view shows the low-type COLMOL with its conveyor elevated for loading into Shuttle Car. The COLMOL advances the face in one operation — moves forward under own power — produces a minimum of fines with greatly reduced dust hazard. This low-type unit provides a cutting width of 9'6" into seams from 30" and up. Conveyor is 42" wide — will raise to maximum height of 50", allowing 38" clearance for Shuttle Car.

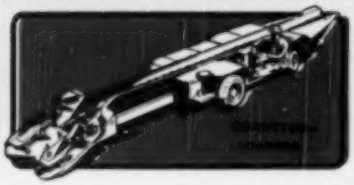
HUTTLE CAR TO . . . SECTIONAL BELT CONVEYOR

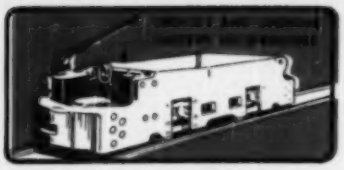


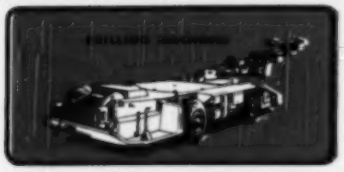
The success of continuous mining operations depends a great deal upon the means used to get the coal away once it is broken down. That is where Shuttle Cars and Sectional Belt Conveyors enter the picture . . they can handle large tonnages quickly and speed coal on its way without interrupting production schedules. A 43" high Shuttle Car is shown above — it has elevating discharge. Also 29" and 35" high Cars — capacities vary from 3.20 tons up to 7.75 tons.

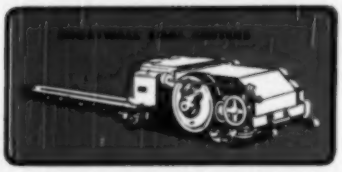


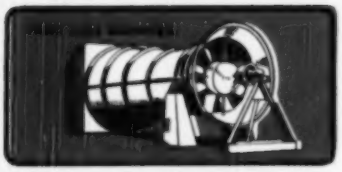
Single pulley and Tandem Drive Sectional Belt Conveyors in widths 26", 30", 36" and 42"—capacities up to 18 tons per minute.

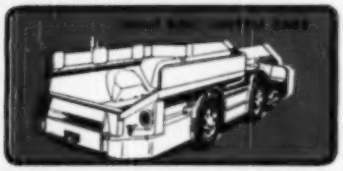


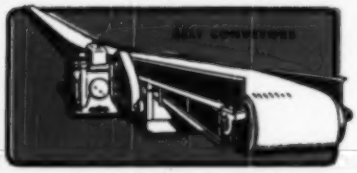












JEFFREY

EQUIPMENT FOR COAL MINES

THE JEFFREY MANUFACTURING COMPANY

Established 1877

General and Export Sales Offices

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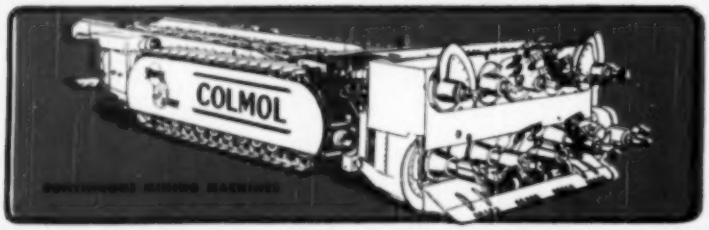
FOREIGN PLANTS

JEFFREY MANUFACTURING CO., LTD., Montreal, Quebec
BRITISH JEFFREY DIAMOND LTD., Wakefield, England
JEFFREY-GALION, PTY., LTD., Johannesburg



G.E.'s 9574 all-purpose* insulating varnish provides BETTER BONDING BETTER PENETRATION NO SLUDGING

Mr. Guy W. Probst

That's what Guy W. Probst, owner of the Lockhaven Electric Repair Co., Lockhaven, Pa., says about General Electric's 9574. Here is his statement:

"G-E general-purpose insulating varnish 9574 gives you a cover coat you can see and that fills up between the Formex wires. I've had very good success with it on armatures up to 2000 RPM. On formed coils I can bake before forming and the turns don't come apart when you pull the coil. I've had no trouble with sludging, and all my work is hot dipped. I find that I only use about half as much 1201 Glyptal as a cover coat on 9574 as I had to use over the varnish I had been using, and I get higher gloss and better bonding when 1201 is used over 9574."

EASY TO USE

BAKES AT LOWER TEMPERATURES than is possible with most other synthetic varnishes.

PENETRATES EASILY into the deepest coils.

NO SPECIAL THINNER required (just petroleum spirits).

STABLE—will not tend to harden in the tank.

SEND FOR BULLETIN! If you haven't yet tried G-E 9574, get in touch with your local G-E Distributor, or write for our new bulletin to Section K2, Chemical Department, General Electric Company, Pittsfield, Massachusetts.

G-E 9574 gives excellent results on all types of coils except extra-high-speed armatures. It is one of G.E.'s complete line of electrical insulating materials, including adhesives, wedges, cements, compounds, cords and twines, sleeving, wire enamels, mica, papers and fibers, permafils, tapes, tubing, varnished cloths, varnishes.

You can put your confidence in

GENERAL ELECTRIC

Section K2, Chemical Department
General Electric Company
Pittsfield, Mass.

Please send me your free bulletin "The Cost-Saving Insulating Team."

Name .....

Business .....

Address .....

City ..... Zone ..... State .....

BWH

DEPENDABLE RUGGEDNESS

BULL DOG V-BELTS demonstrate how to get the most out of V-Belts

Fractional Horsepower (FHP)—V-Belts in three standard sections, full range of lengths.

WEAR-RESISTANT COVER, protects heart of belt from dirt, grease, moisture.

COMPRESSION SECTION, engineered to withstand continual flexing.

BULL DOG CORDS, powerful load-carrying section.

Industrial V-Belts in A, B, C, D and E sections — full range of lengths from 26"-660".

OUTSTANDING ADVANTAGES OF BULL DOG V-BELTS

1. Fewer Maintenance Headaches. Because BULL DOG V-BELTS require less adjusting and last longer, they save time, money and worry in maintenance.

2. Longer Belt Life. Because new, quality-controlled compounds developed in BWH laboratories run cool, don't crack or deteriorate under severe flexing.

3. Backed by BWH Reputation for Extra Service. In the 72 years that BWH has been a leader in the mechanical rubber manufacturing field, BWH products have built steady fame for outstanding performance. BULL-DOG V-BELTS fully live up to BWH reputation for dependable ruggedness.

Efficient V-Belt operation insures steady, smooth, low-cost power transmission, without maintenance worries, over long periods of time. And that's exactly the kind of economical, worry-free service BULL DOG V-BELTS deliver in all types of industry.

Each job has its own problems, however. Here are some of the common ones that engineers report in V-Belt operation, with BWH solutions:

PROBLEM	SOLUTION
Excessive Cover Wear on V-Belts	Check sheaves for worn grooves. Check alignment between sheaves. Check to see that sheaves are tight on shafts.
Covers Loosen .. Rubber Gets Soft and Sticky	Check for excessive oily conditions. If contact with oil or grease cannot be prevented, then specify BULL DOG HSO V-BELTS, which are oil resistant. (Also heat resistant and static conduc.ing.)
V-Belts Failing Within Few Hours of Installation	This is usually caused by prying V-Belts over edge of sheaves, causing internal cords to break. Correct method of installation is to move motor of driven machine until belts do not have to be forced onto sheaves. Then move motor back until sufficient tension is applied.
New V-Belt Installed As Replacement Fails, While Old Belts Continue Running	Never install a new belt in a set of old belts, because it will be either shorter or longer than the old belts. If shorter, it will be excessively overloaded and fail. If longer, it will not transmit an equal share of the load. Always install a complete new set of belts and retain old belts for an emergency, or for temporary replacement if needed.

It will pay you to investigate BULL DOG V-BELTS on your next installation. They have what it takes for smoother operation on both FHP motors and on high-powered industrial jobs.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems. We're specialists in solving them. Consult your nearest BWH distributor or write us direct.

FOR ALL MECHANICAL RUBBER GOODS CONSULT BWH

Established in 1878, BWH is today one of the world's largest manufacturers of mechanical rubber goods. Among the quality-famous BWH products which are today helping industry to do better jobs at lower cost are the following:

CONVEYOR BELTING	OIL INDUSTRY HOSE
ELEVATOR BELTING	STEAM HOSE
TRANSMISSION BELTING	WATER HOSE
AIR HOSE	OIL FIELD SUPPLIES
CONTRACTORS' HOSE	FRICTION TAPE
FIRE HOSE	SPLICING COMPOUND

BWH — DEPENDABLE RUGGEDNESS

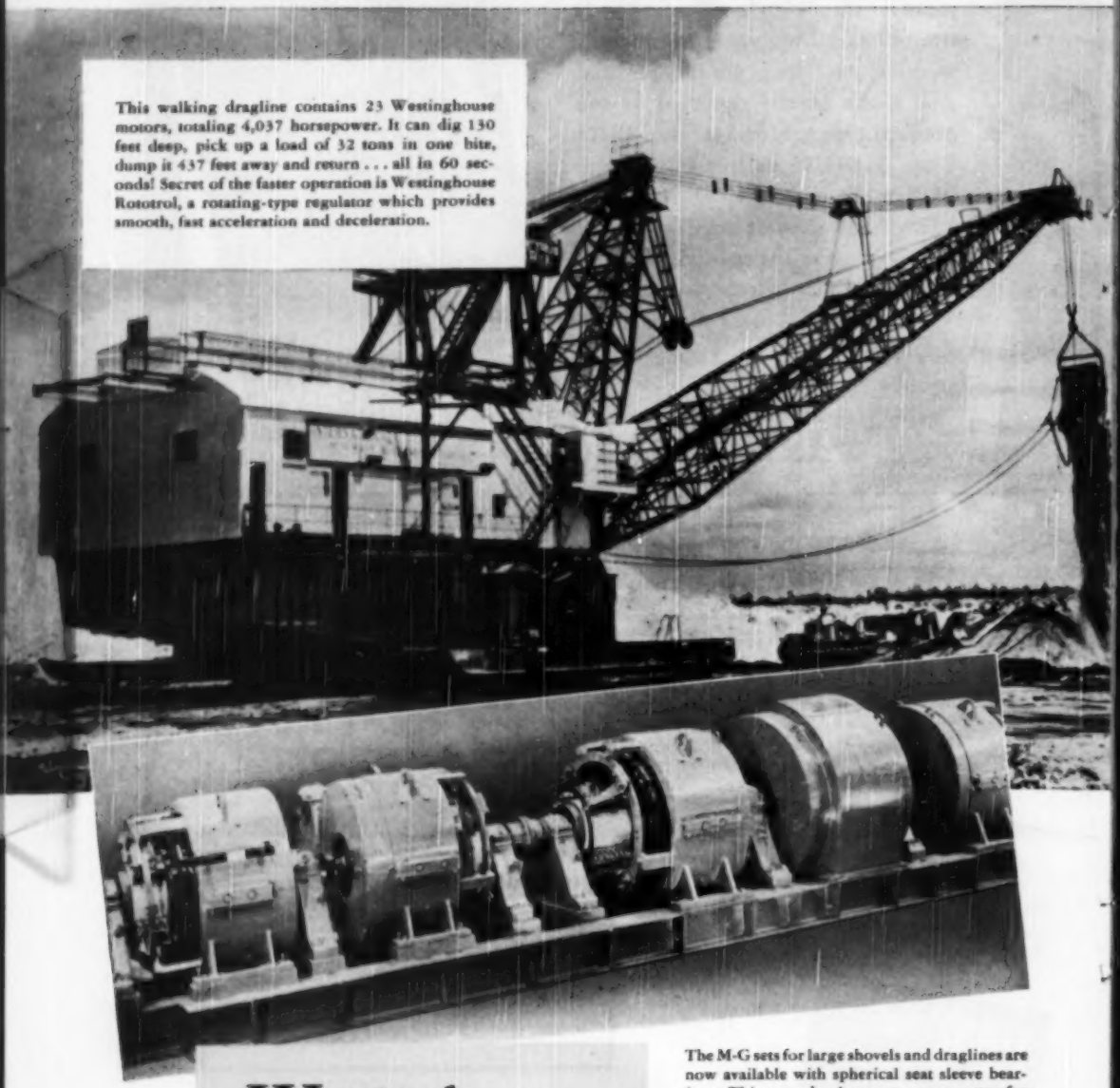
Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS., U.S.A. • P.O. BOX 1071, BOSTON 3, MASS., U.S.A.

YOU CAN BE SURE.. IF IT'S Westinghouse



This walking dragline contains 23 Westinghouse motors, totaling 4,037 horsepower. It can dig 130 feet deep, pick up a load of 32 tons in one bite, dump it 437 feet away and return . . . all in 60 seconds! Secret of the faster operation is Westinghouse Rototrol, a rotating-type regulator which provides smooth, fast acceleration and deceleration.

The M-G sets for large shovels and draglines are now available with spherical seat sleeve bearings. This new development compensates for misalignment and provides adequate lubrication even under severe operating conditions and tilts up to 15°.

Westinghouse

EQUIPMENT FOR THE MINING INDUSTRY

Westinghouse-equipped draglines and shovels

FOR MORE TONS PER MAN-HOUR

Some two-thirds of all large draglines in use in this country are Westinghouse equipped. Many of these are in use by operators who have again and again specified Westinghouse equipment.

For instance, one northern Illinois coal company and an associated company have purchased a total of four large draglines in the past few years. Each time Westinghouse equipment was specified. Another case is a Pennsylvania coal operator who has purchased three such draglines on all of which Westinghouse equipment was specified.

There must be reasons why Westinghouse equipment is so well liked by operators who have tried it. Here are a few of them—

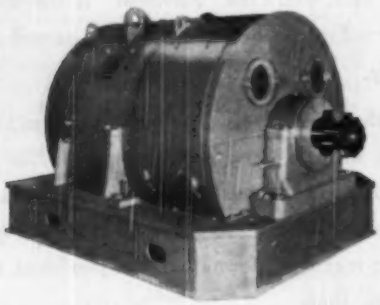
Smooth operation is brought about by Rototrol. This rotating regulator developed by Westinghouse makes possible speed changes with less strain, resulting in less maintenance and smoother operating characteristics throughout.

Fast operation comes from the higher bucket-lowering speeds of the large Westinghouse drive motors. It comes, too, from the fast swing cycle and accurate spotting of bite and drop that Rototrol makes possible.

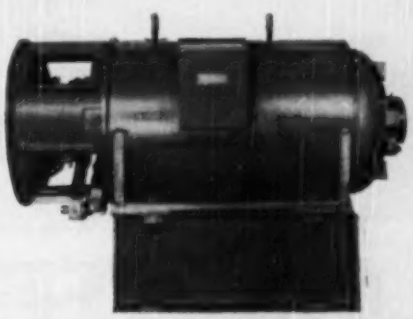
Reliable operation of Westinghouse equipment reduces down time. For example, Rototrol is the simplest of all rotating controls, both as to apparatus and circuits. The large M-G sets are equipped with spherical seat sleeve bearings designed to permit continuous operation even at tilts of up to 15°. Many of the small motors have sealed, pre-lubricated bearings that require no lubrication, and that have a *proved* record of lower maintenance.

This co-ordinated equipment for shovels and draglines is a product of the more than half a century during which Westinghouse engineers have worked with the Mining Industry. If you are interested in handling more tons per man hour, let our Mining Industry Specialists help you work out the answers. Call your nearest Westinghouse Office, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

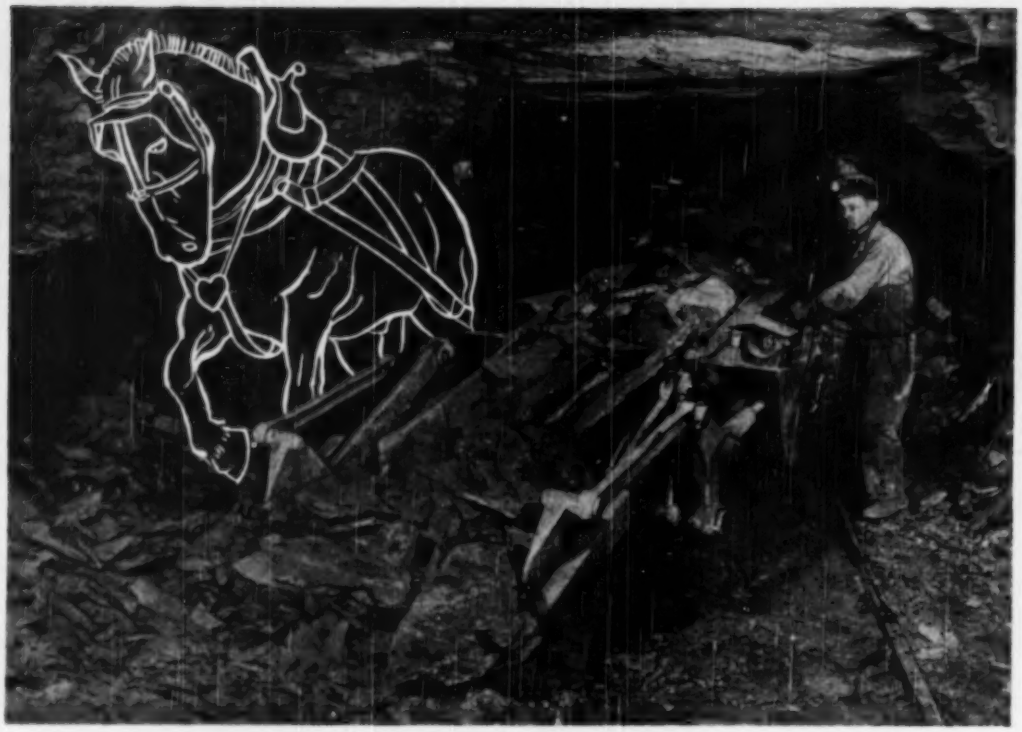
J-94809



In large drive motors such as this, the use of poleface compensated winding makes possible a smaller armature diameter and a lower WR^2. This feature is available both on the 425-hp motor and the 600-hp motor now being offered for use on shovels and draglines.



This is the Rototrol unit that has revolutionized performance of shovels and draglines. By eliminating the sharp changes and attendant strains of Magnetic Control previously used, Rototrol speeds operation and reduces maintenance costs.



"Clean-Up" is TOUGH Work . . . but the "AUTOMAT" is built to TAKE IT!

★ In many mines you'll find the Whaley "Automat" in the tough work . . . around the clock . . . 3 shifts a day. It is in a class by itself in taking top or bottom in entries to increase height, making grades, cleaning up falls, etc. The "Automat" is the one high capacity loader that will load slate or rock equally as well as coal and do it consistently.

If you want a loader that will increase your loading time at the face as well as keep your mine in good productive condition day-in and day-out, then you need the dependable Whaley "Automat." Write today for our new Catalog 250 giving you the most graphic and complete loading machine information ever published. Myers-Whaley Co., Knoxville, Tenn.

MYERS-WHALEY

"MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS"

For heavy duty conveyors–

IT'S TIMKEN®...

Time and time again the advantages of Timken® tapered roller bearings have been proved for heavy duty conveyor belt idlers. For over 25 years, Timken bearings have been assuring long, trouble-free idler life to conveyor operators. For instance, this installation at the Rail-to-Water Transfer Company, Chicago, has carried approximately 8 million tons of coal since 1943. Not one of the Timken bearing equipped idlers made by Webster Manufacturing, Inc. has needed repair or replacement to date.

AND TIMKEN...

Timken bearing equipped idlers made by the Stephens-Adamson Manufacturing Company help bring gold ore to the surface at the 7,500 foot deep Marievale Consolidated Mines, Johannesburg, South Africa. Timken bearings take both radial and thrust loads in any combination. Idlers turn freely, belt wear is reduced to a minimum. Effective seals keep lubricant in and moisture out. Maintenance time and materials are saved.

AND TIMKEN AGAIN!

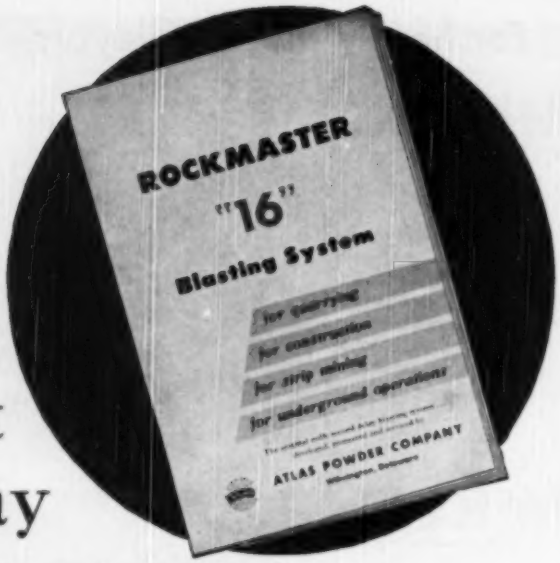
Three 24" conveyors totalling 150 feet in length were installed last year at this large crushing and screening plant in Vassalboro, Maine. 210 Timken bearings in 45 Pioneer Engineering Works, Inc. idlers help keep it running smoothly. On conveyors and throughout all industry, Timken bearings are first choice. There's no other bearing with so much to offer—no other bearing so fully proved! The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Wherever the going's tough industry turns to

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION



In this booklet you may find the answer to your blasting problems!

WHETHER you blast rock, coal, or ore—on the surface or underground—it will pay you to read the ROCKMASTER "16" booklet.

Read how this blasting system, pioneered by Atlas, controls timing between holes to thousandths of a second, with *sixteen* delay detonators. Read how the proper control of loading, explosives, and timing controls breakage and throw as they never could be controlled before . . . cuts down noise and vibration . . . often means important savings in drilling and dynamite.

This ROCKMASTER "16" booklet includes diagrams of typical loading in quarries, strip pits, mines, and many types of construction. This valuable booklet is free to blasters. Write or phone the nearest Atlas office for your copy *now!*

Branch Offices: CHICAGO 3, ILL., 135 S. LaSalle St. • JOPLIN, MO., 612 Joplin Nat'l Bank Bldg. KNOXVILLE 3, TENN., Hamilton Nat'l Bank Bldg. • NEW YORK 17, N. Y., 60 E. 42nd St. PITTSBURGH 22, PA., 1544 Oliver Bldg. • SAN FRANCISCO 4, CALIF., 1 Montgomery St. SEATTLE 1, WASH., 1320 Joseph Vance Bldg. • TAMAQUA, PA., First Nat'l Bank Bldg.

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

SMOOTH TRAVELING FOR MINE POWER

EVER THINK OF BOREHOLE AND SHAFT CABLES AS HIGHWAYS?

That's just what they are. They're the roads over which electric power must travel in order to reach the underground workings of mines. And with vital machinery depending on that power for the steady output that means high production, "back-road" cables must be ruled out.

That's why it's wise to remember Simplex-ANHYDREX Borehole and Shaft Cables. Their Anhydrex insulation is a special low water absorption compound that can't be beat for long life . . . and during that long life . . . for resistance to moisture and electrical leakage. Their neoprene jackets can be relied upon for balanced protection against abrasion, oil, heat, sunlight and flame.

Simplex-Anhydrex Borehole and Shaft Cables are free of heavy metallic sheaths; you save on cost and eliminate much of the labor usually needed for installation. They can be had in single or multi-conductor types, designed for whatever voltage is required. For full details contact the Simplex representative in your area or write us direct.

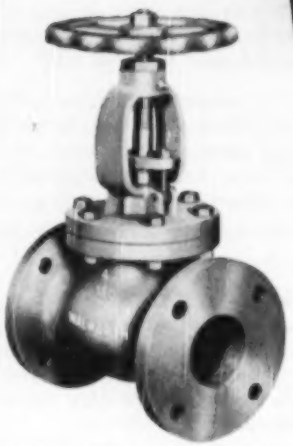
SIMPLEX-ANHYDREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Newly Designed Walworth Valves to combat corrosion

Walworth 150-pound Stainless Steel Gate Valve . . . available in sizes ½ to 3-inch, screwed; ½ to 12-inch, flanged.

Made of Stainless Steel
Monel · Nickel
Acid-resisting Bronze
Ni-resist



Walworth 150-pound Stainless Steel Globe Valve . . . available in sizes ½ to 3-inch, screwed; ½ to 6-inch, flanged.

Sectional view of Walworth 300-pound Stainless Steel Gate Valve . . . available in sizes 2 to 6-inch, flanged.

— ENGINEERED AND TESTED FOR TOUGH . . . HARD SERVICE

Walworth offers a comprehensive line of valves made of several cast stainless steels and special alloys for piping services where corrosion is a factor. These valves are available in Gate, Globe, Angle, Check, and Lubricated Plug types.

Gate, Globe and Angle Valves have outside screw and yoke construction, thus keeping the stem threads out of contact with the corrosive material in the line. They also have a two-piece bolted gland with ball-type gland follower to prevent binding the stem when packing bolts are tightened. Gland eye-bolts can be conveniently swung out of the way without danger of loss when the gland is lifted for repacking.

Gate Valves have taper seats with a unit consisting of two flat faced discs supported by a carrier on the end of the stem. The discs are of a proven ball-and-socket type. They are free to rotate and adjust themselves to the body seat angles, assuring tight seating with no possibility of sticking in any position.

For further information about Walworth's full line of corrosion-resistant valves, see your Walworth distributor.

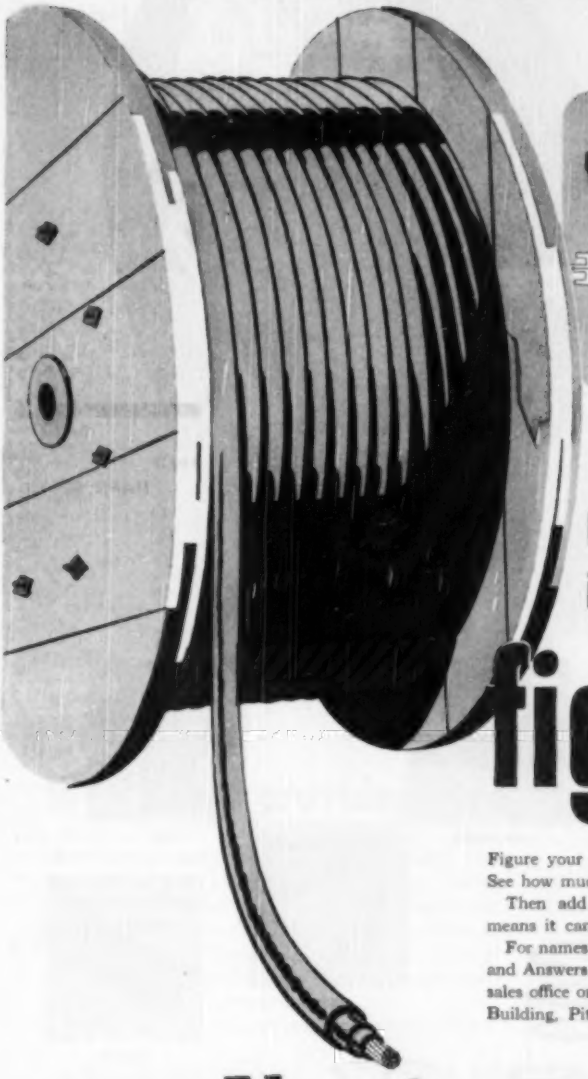
WALWORTH

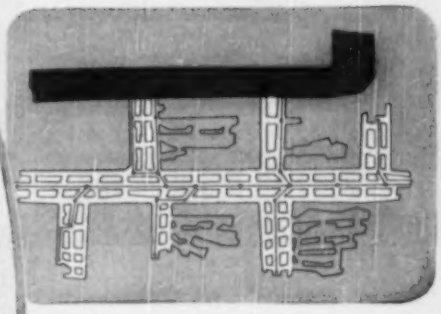
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Opening **new territory?**





Unless you figure power cable in aluminum, you don't

figure low

Figure your power cable two ways—in aluminum and in copper. See how much you can save with aluminum.

Then add savings in installation. Aluminum's lighter weight means it can go in faster, takes less effort to install.

For names of manufacturers and copy of "Installation Questions and Answers about Alcoa E.C. Aluminum", call your local Alcoa sales office or write ALUMINUM COMPANY OF AMERICA, 1787E Gulf Building, Pittsburgh 19, Pennsylvania.

Aluminum Conductors

of ALCOA EC ALUMINUM are made by leading manufacturers

for
modern
mining

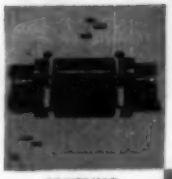
YARDLEY "TRU-SIZE" Plastic M Pipe

Illustration shows a 200-ft. coil of 2" pipe. Approximate weight, 90 lbs.

End corrosion troubles for good. Use Polyethylene plastic pipe that is resistant to acids and alkali. It is light, flexible and tough . . . withstands normal operating pressures and temperatures . . . cuts installation costs up to 60% . . . requires minimum maintenance.

Yardley M pipe comes ready to use with accessories illustrated. Sleeve-type outside couplings quickly attached with stainless steel clamps. Warehouse stocks near most mining areas.

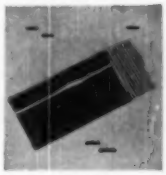
Write us for nearest distributor.



COUPLING

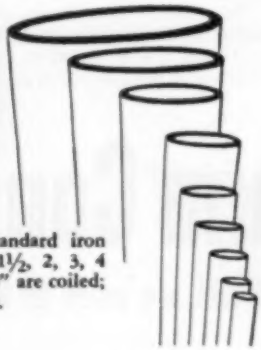
TEE

ELBOW



ADAPTER

made in 9 sizes...



Plastic M pipe comes in standard iron pipe sizes: ½, ¾, 1, 1¼, 1½, 2, 3, 4 and 6 inches. Sizes through 3" are coiled; 4" and 6" in straight lengths.

YARDLEY PLASTICS CO.

142 Parsons Ave. • ADams 9315

Columbus 15, Ohio

You Get Longer Service from Rome 60 MINING CABLES!

Look for Appro. No. P-105 BM Molded in the Neoprene sheath—your assurance of compliance with Federal and Pennsylvania Safety Codes.

NEOPRENE WEBBING provides *extra* protection against shorts

Short cuts don't *cut shorts* . . . another reason why more mines are switching to Rome 60 Mining Cables. The Neoprene webbing which separates the ground wire from the two insulated conductors on Rome Parallel Duplex is only one example of the *extra protection* Rome builds into its products to minimize your operating costs.

Aided by alert research and engineering, Rome is constantly on the lookout for better materials and better methods. That's why Rome 60 Mining Cables are regarded by mine operators as the best available. Crush resistant, heat resistant, flame resistant, acid resistant, abrasion resistant, non-kinking, and uniform in diameter, they combine *all* the qualities that give you the longest service. Ask for our descriptive folder and compare for yourself.

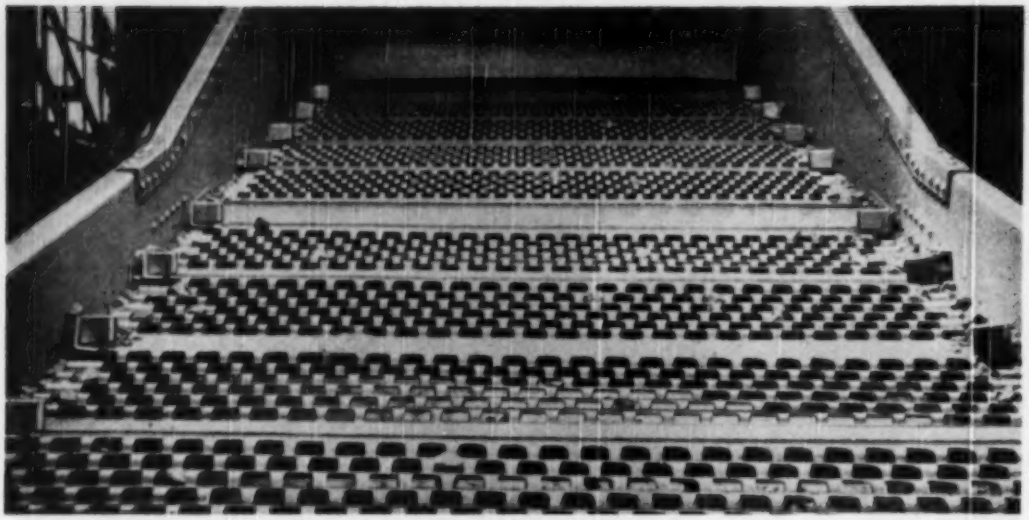
IT COSTS LESS TO BUY THE BEST...BUY ROME 60

THE ROME 60 LINE INCLUDES:

- Type SO portable cords
- Single conductor locomotive cables
- Concentric mining machine cables
- Twin (parallel duplex) mining machine cables—types W and G
- Multiple conductor portable power cables types W and G

ROME CABLE
Corporation
ROME • NEW YORK
From Bar to Finished Wire

ROME CABLE ROME, N.Y.



To Speed Coal Production

For the coal industry Hendrick's outstanding line includes Perforated Plate for Vibrating and Shaking Screens, Flanged-Lip Screens, Wedge-Slot Screens, Elevator Buckets, Flights, Shaker Conveyor Troughs and Ball Frames.

- **Hendrick Perforated Plate** maintains uniformity of mesh throughout an unusually long service life. Its full clearance obviates clogging, and the ease with which decks can be changed minimizes labor costs.

  It can be furnished, either flat or corrugated, with any desired shape and size of perforation, in proper gauges of tank, high carbon, high tensile, and abrasion-resisting steels, and in other commercially rolled metals. Write for copy of Hendrick Perforated Plate catalogue.

- **Hendrick Flanged-Lip Screens** for screening and dewatering coal are available with short, medium or long slots, in 148 different standard slot sizes. The staggered slots, tapered in the direction of the flow, are practically non-clogging, and the flange at the end of each slot aids in producing faster and cleaner separation of the material. Write for copy of Hendrick Flanged-Lip Screen booklet.

- **Hendrick Wedge-Slot** Dewatering and Dryer Screens have uniquely designed profile bars, with openings enlarging downward, through which moisture and undersize particles clear rapidly. Profile bars are of different types to suit specific applications. The accurately spaced slots extend uninterruptedly the entire length of the screen. Write for detailed information.

- **Hendrick Shaker Conveyor Troughs,** of high carbon steel, offer maximum resistance to abrasion, and to bending, breaking or buckling. **Ball Frames** give the troughs substantial support whatever the floor conditions.

- **Hendrick Elevator Buckets** are made to specifications in any desired size, shape and capacity; plain or perforated; welded or riveted; to handle either wet or dry material.

- **Hendrick Mitco Open Steel Flooring** has 90% open area to permit maximum light and ventilation. Square-edge, uniformly spaced bars provide a non-slipping, level walking surface. Pressure-formed construction makes each Mitco panel an exceedingly strong, integral unit. Write for copy of Hendrick Mitco Products catalogue.

SEE OUR CATALOG IN SWEET'S

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Mitco Open Steel Flooring
"Shur-Site" Treads and Armorgrid

HENDRICK
Manufacturing Company
41 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

Rolling Again in 36 Hours

THANKS TO ALLIS-CHALMERS CERTIFIED SERVICE!

A vital press of the *Detroit News* went out of commission when a 5 hp inching motor, overspeeded at 20,000 rpm, flew apart. Stecker Electric, an A-C Certified Service Shop, was called. Broken end bells had to be welded and machined to fit. The stator was rewound. Rotor windings were replaced. After completely testing the motor, it was back in service in just 36 hours!

IN DETROIT, and over 75 other cities covering all major industrial areas, you will find Allis-Chalmers Certified Service Shops. Make them your source for fast, reliable electrical repair service! Independently owned and operated, these shops have been selected for their experience, highly skilled workmen, complete servicing facilities, and sound business reputation.

To save time, trouble and money on emergency or routine maintenance service call on your nearest Allis-Chalmers Certified Service Shop.

GOOD SOURCE FOR NEW MOTORS, TOO

Remember — your local Allis-Chalmers Certified Service Shop or Authorized Dealer offers the same fast, dependable delivery on new motors—plus matching control from one to 200 hp. For service or new equipment, count on Allis-Chalmers.

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

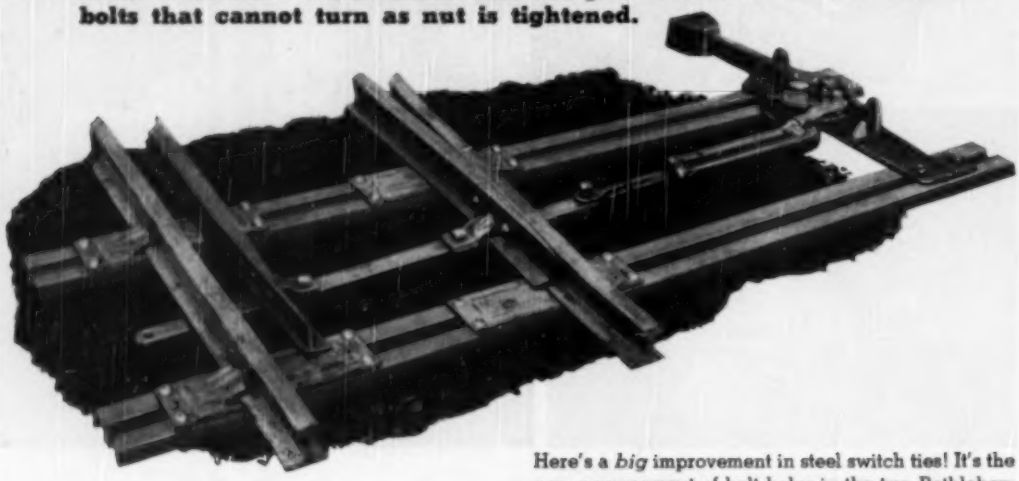
Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

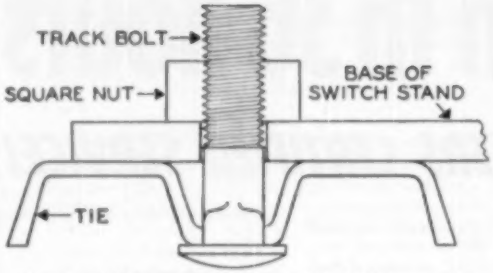
A-C

ALLIS-CHALMERS

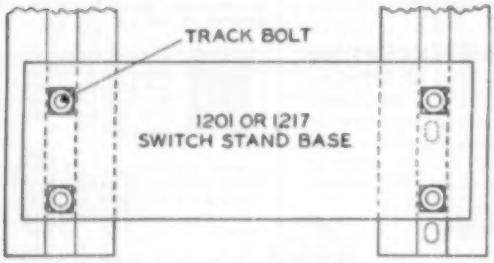
IT'S SO EASY!

New hole positions in Bethlehem Switch Ties make it easier, faster, safer to install switch stand. Ties are punched for standard track bolts that cannot turn as nut is tightened.





Note how bolt is inserted through channel of tie. The fit is snug, tight.



Switch stand centers on the ties, getting firm, even bearing.

Here's a *big* improvement in steel switch ties! It's the new arrangement of bolt holes in the two Bethlehem ties that carry the switch stand.

These holes accommodate standard track bolts (the kind most commonly used in mines), thereby eliminating the need for special-sized bolts. The holes are oval in shape; the oval-neck bolts, once inserted, simply cannot turn. No longer is it necessary to risk pinched fingers by holding the head of each bolt as the nut is being tightened. Moreover, the holes are punched in the channel section of the ties, so that the switch stand can be centered.

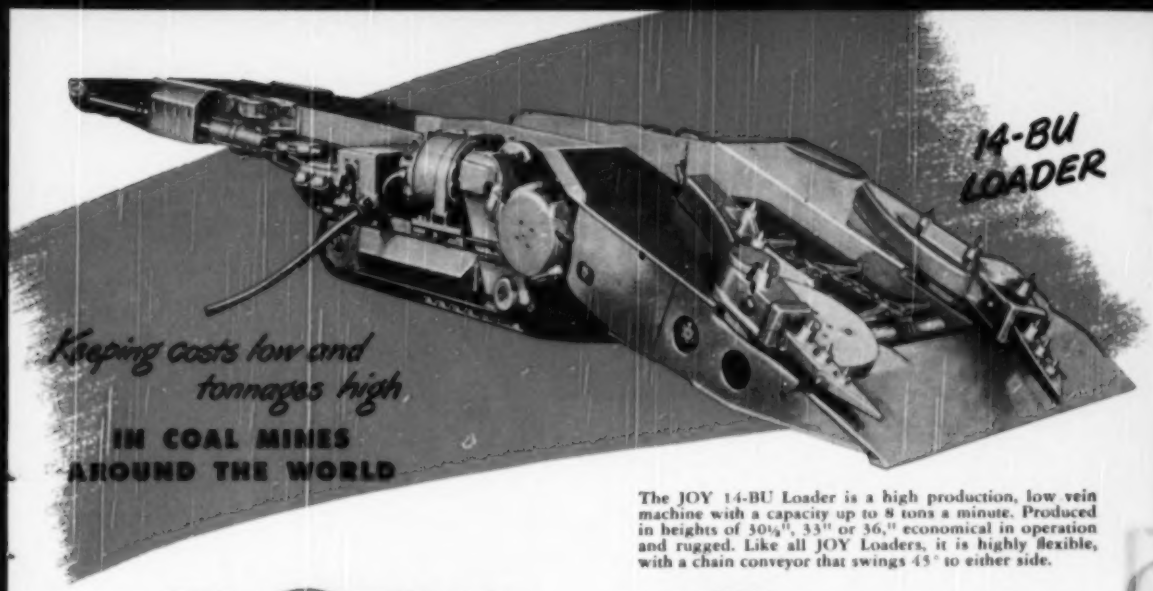
Another big help: the tie for the number two position is punched with two sets of holes. Thus it makes no difference whether you want the switch stand on the left or the right side of the track. Using a Bethlehem 1201 or 1217 stand, you can place it on *either* side with *either* a right-hand or left-hand turnout.

Ask a Bethlehem man to show you the advantages of this new, convenient arrangement.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★



Keeping costs low and tonnages high
IN COAL MINES AROUND THE WORLD

The JOY 14-BU Loader is a high production, low vein machine with a capacity up to 8 tons a minute. Produced in heights of 30½", 33" or 36," economical in operation and rugged. Like all JOY Loaders, it is highly flexible, with a chain conveyor that swings 45° to either side.

JOY

LOADERS, CUTTERS, SHUTTLE CARS and MOBILE COAL DRILLS

Illustrated on this page is a typical JOY "team" of-high-production mining machines for thin-seam trackless operation. In soft or hard coal—no matter what your mining conditions are—you'll realize greater efficiency and economy with *field-proved* JOY Equipment . . . built by the world's largest producer of underground mining machinery.

11-RU CUTTER

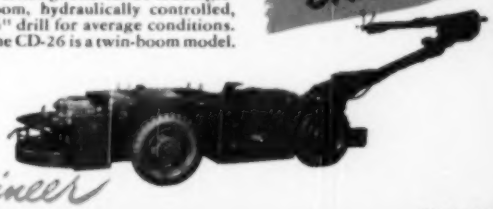
JOY Trackless Universal Cutters—the 11-RU for low coal and the 10-RU for thick seams—are highly maneuverable, fast, hydraulically controlled machines that can make horizontal or shear cuts anywhere in the face.

6-SC SHUTTLE CAR

The JOY 6-SC Shuttle Car is ahead of anything in its class in safety features and operating advantages. Only 29" high for thin seams—has four wheel drive, four wheel steering, hydraulically adjustable elevating discharge.

CD-25 COAL DRILL

JOY Mobile Coal Drills are highly maneuverable, fast-tramming units that feature an exclusive, automatic, infinitely variable control of both rotation and feed in drilling. The CD-25 is a single-boom, hydraulically controlled, 36" drill for average conditions. The CD-26 is a twin-boom model.



Write for Bulletins, or

Consult a Joy Engineer

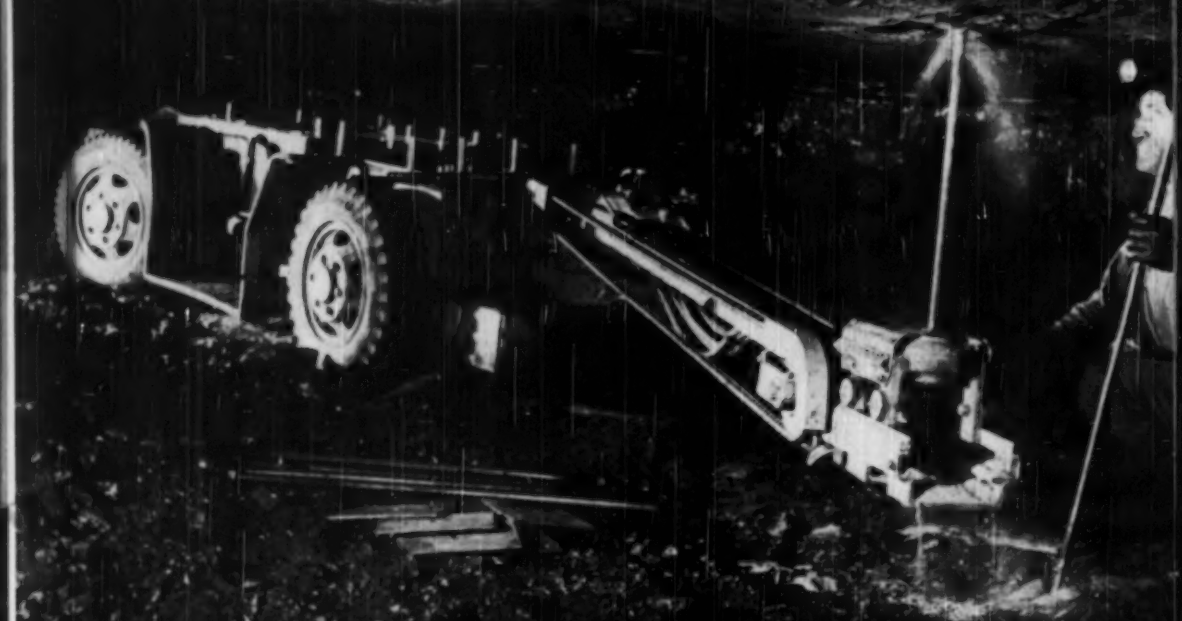
WAD CL 3046

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

The JOY *Hydraulic* ROOF BOLTING DRILL



Fastest Drilling Unit Available

for Roof Bolting

Built in 26", 30" or 36" High models

★ Performance of the JOY RBD-1 Hydraulic Roof Bolting Drill is *proved* by months of operation in the field.

★ Wherever rotary drills are applicable, it has consistently out-drilled other types—both pneumatic and electric drills—*producing as many as two-thirds more holes per shift!*

★ In practically all cases, this Drill will bottom your roof-bolting holes with only one steel change—something that *no other drill will do* except in the thickest seams.

★ The JOY Hydraulic Roof Bolting Drill is rubber-tired and self-propelled—equipped with hydraulic controls for *one-man operation.*

★ May be equipped for wet drilling—or with vacuum dust remover, as desired, *to eliminate objectionable dust.*

★ The Drill employs boom feed, and is *self-leveling* and *self-aligning* while drilling.

★ SULMET Carbide Bits and Drill Steels specially designed for the RBD-1 Drill are available.

Consult a Joy Engineer

WBD CL3050

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IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

JOY SAFETY CIRCUIT CENTERS and "SPB" BIGUN CONNECTORS

Complete Line Available

All SCC units are equipped with "Mines" Connectors—moisture, oil and wear-resistant—available in a complete range of sizes and types.

Above: Full Height SCC with Dust-Resistant Housing. The Permissible unit for high coal is shown in use, top of page.

Above: Low Height SCC with Permissible Housing, for thin-seam gaseous mines. Single and multiple-outlet types.

Right: Low Height SCC with Dust-Resistant Housing, for entries and non-gaseous operations in thin seams.

Here is *packaged* wiring—"Mines"-built Safety Circuit Centers used with "Mines" Electrical Connectors for individual power take-offs—by far the best and most efficient power distribution system for modern mining machinery. These SCC units not only give you maximum protective value, but maximum productive machine time as well . . . and they're fool-proof, trouble-free, and completely portable. Built in low or high coal models, with permissible or dust-resistant housings, in sizes and current ratings to match any mining requirement. ● *Let us show you how "Mines" SCC units and Connectors can give you another boost on the road to greater production and lower costs!*

W&D ME 3042

Consult a Joy Engineer

for complete details and prices

MINES EQUIPMENT MINES *Division*

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Where Service Life Counts Most

COMMERCIAL FUEL CO. USES J&L WIRE ROPE

J&L STEEL

Marion 5560 with a 32-yard bucket (above) and (right) Bucyrus-Erie 500-W dragline moving overburden for Commercial Fuel Company. These machines uncover more than one million tons of coal per year—use J&L Wire Rope to cut costs.

J&L Hoist Ropes and Draglines Pay Off in Cubic Yard Mileage on Big Equipment

Commercial Fuel Company knows that strip mine profits really take a beating when a 32-cubic-yard shovel bucket and a twelve-yard dragline have to stop moving overburden because of a breakdown. That's why Commercial Fuel Co. cuts downtime to a minimum by using J&L hoist ropes on its huge Marion 5560 Shovel and J&L draglines on its Bucyrus-Erie 500W.

Stripping two pits near Cumberland, Ohio, these two machines remove an average of 50 feet of overburden from the more than a million tons of coal that Commercial Fuel Co. mines each year. Operating on a schedule such as this, big equipment has to produce and *keep on producing*—or loading, hauling equipment and men are forced into costly idleness.

Commercial Fuel Co. knows how to keep its equipment producing. Records show that J&L Wire Rope can be counted on for *extra* economy through longer service life—less equipment downtime. Long life is a built-in feature of J&L wire rope.

Quality is controlled by J&L in every step of manufacture from the mining of the ore through the final stranding and closing operations.

ATTENTION
MANUFACTURERS · OPERATORS

If you build or operate shovels, draglines, scrapers, or any other type of equipment where wire rope is important to economy and efficiency of operation, contact J&L for information regarding the specific design of wire rope that will do the best job for you.

Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
Pittsburgh 30, Pennsylvania

I am interested in using the right wire rope for the job. Please send me a free copy of your handbook "Wire Rope is a Machine."

NAME _____

COMPANY _____

ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

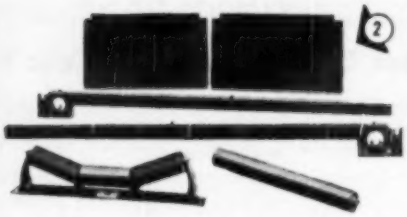
NOW STOCKING
THIS OUTSTANDING
UNDERGROUND BELT CONVEYOR

THESE *Superior* DESIGN FEATURES:

1

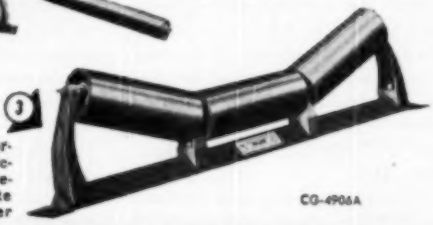
DRIVE SECTION—Designed for easy dismantling. Available for A.C. or D.C. operation up to 75 H.P. Larger drive units upon request.

Typical CONTINENTAL underground Belt Conveyor installation.



2

INTERMEDIATE SECTION — Designed for easy erection and dismantling, thus requiring a minimum of personnel during moves or extensions. Available in lengths up to 3000 feet.



3

IDLER ROLL — Four-inch diameter anti-friction idler rolls. Designed for complete lubrication from either side.

CG-4906A

Complete units available in 24", 30", 36" and 42" belt widths.

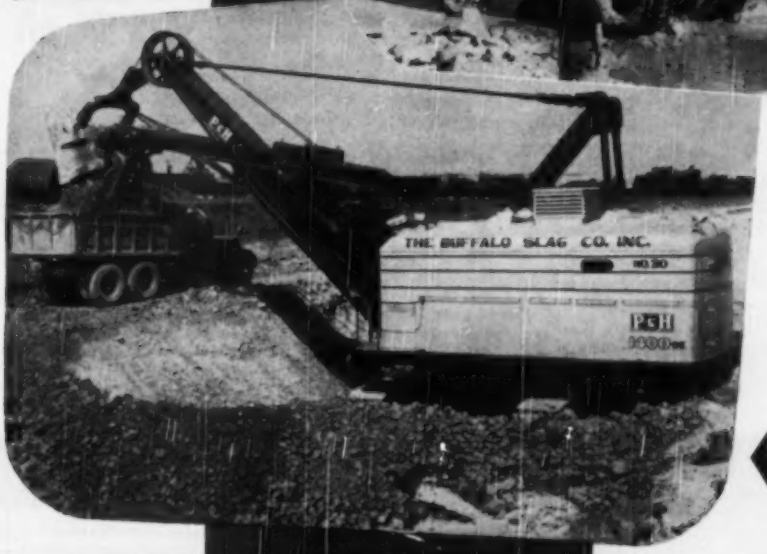
For Other Types of Belt Conveyor Equipment, See Our Catalog ID-481

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

For Rock Bottom Costs From Start to Finish!

START . . . FLUXING STONE
A P&H Model 1400 Diesel-Electric (4 yd.) shovel, owned by Drummond Dolomite Inc. at Drummond Island, Michigan.



FINISH . . . BLAST FURNACE SLAG
A P&H Model 1400 Diesel-Electric shovel owned by the Buffalo Slag Co., Buffalo, New York.

P&H DIESEL-ELECTRIC SHOVELS

with MAGNETORQUE* HOIST DRIVE

Now, you can have electric shovel efficiency *anywhere* with a P&H Diesel-Electric quarry and mining shovel. It's a complete electric shovel . . . with the addition of a diesel engine to furnish power . . . entirely independent of high line service.

Years of the toughest rock digging have proved the P&H Diesel-Electric from every standpoint . . . dependable operation . . . less maintenance . . . rock bottom tonnage costs.

This simplified P&H Diesel-Electric shovel is made possible by the exclusive P&H Magnetorque Hoist Drive. Hoist generator, hoist motor, slip friction clutch and other mechanical devices are completely eliminated. Magnetorque is only one of many P&H Added Values. Ask for Bulletin X83-DE.

Every Third P&H Electric Shovel Sold is a Repeat Order.

*Trade-Mark of Harnischfeger Corporation for electro-magnetic type clutch

P&H ELECTRIC SHOVELS
4540 West National Avenue
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

CARBOLOY

Pioneer cemented carbide manufacturer in the United States
World's largest manufacturer of cemented carbides

guarantees you coal-mining tools of uniform high quality

THERE IS ONE all-important thing to remember in selecting your coal-mining tools.

This is it: *It is not the initial cost, but the performance delivered, that counts.*

And with mining tools of Carboloy Cemented Carbide, you always get uniform high performance *and* quality.

For *only* Carboloy is backed by 29 rigid quality tests—each one devised to assure you of getting the best carbides in the industry.

More, Carboloy offers you many *other* quality and service assurances—assurances that spell lower cost of drilling per ton *for you*. Here are some of the reasons why it is smart to count on Carboloy for quality:

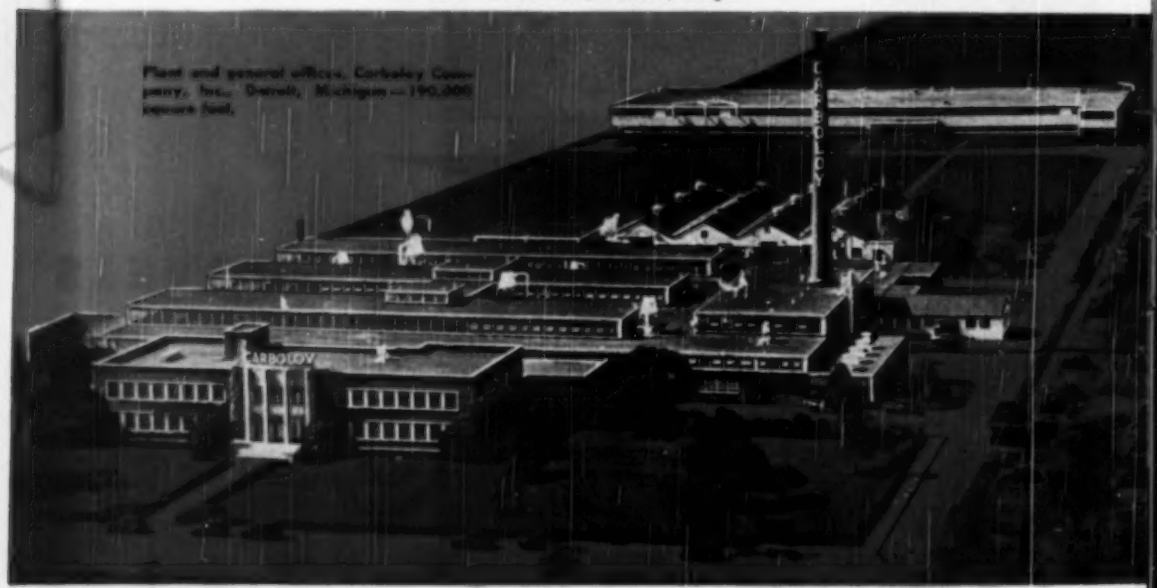
1 **Carboloy's program of continuous grade improvement**—rather than changing grades for special purposes.

2 **Carboloy's program of engineering and research**—the nation's largest and most complete facilities devoted to carbides.

3 **Carboloy's unexcelled production facilities**—the finest in the world for mass production of cemented carbide tools.

If you're looking for lower drilling cost per ton; if you're looking for uniform high quality in all your coal-mining tools; if you're looking for true economy of operation, you'll do well to look to Carboloy. Remember: Not the initial cost, but the performance delivered, counts. And Carboloy delivers top performance always.

CARBOLOY COMPANY, INC.
11120 E. 8 Mile Blvd., Detroit 32, Michigan



Plant and general offices, Carboloy Company, Inc., Detroit, Michigan—190,000 square feet.

FOR LOWER DRILLING COST PER TON

for pin hole drilling

NEW! Improved Carboloy Pin Timbering Drill—

Fast, easy drilling in hard slate, shale and laminated limestone. Extra dividends in reduced equipment costs and handling time. Carboloy's Pin Timbering Drill offers you this, and more, too.

This improved drill is tipped with Carboloy Cemented Carbide, *the hardest metal made by man.* It assures maximum speed in medium roof drilling, and develops faster drilling speed than pneumatic methods. Check these points: improved flute design, removes cuttings faster; alloy steel body, for greater strength; plus a carbide tip that will drill *more* holes.

Carboloy's Improved Auger Drill Bit

— for faster, easier drilling

Unbeatable—you'll slash coal drilling costs right and left with this improved auger drill bit. Ideal for post, mounted and push drills. Look at this:

- **Maximum clearance and relief angles permit freer, faster cutting.**
- **Improved spiral prevents packing of coal cuttings.**
- **Uniform high-quality carbide throughout entire tip. Assures longer bit life.**
- **Long tips of Carboloy Cemented Carbide permit many more regrinds.**

PLUS **Forged alloy steel shank—heat treated.**

Carboloy's Improved "Finger Bit"

— for strip, underground mining

Ideal for use in hard-to-take-hold-of medium ground! Provides real gouging action. Fits all standard auger drill heads using ½" bits. Check these plus values:

- **Faster cutting due to larger clearance angle on shank.**
- **Drills more freely.**
- **Less pressure required.**
- **Uniform high quality throughout entire tip. Assures longer drill life.**

PLUS **Forged alloy steel shank—heat treated.**

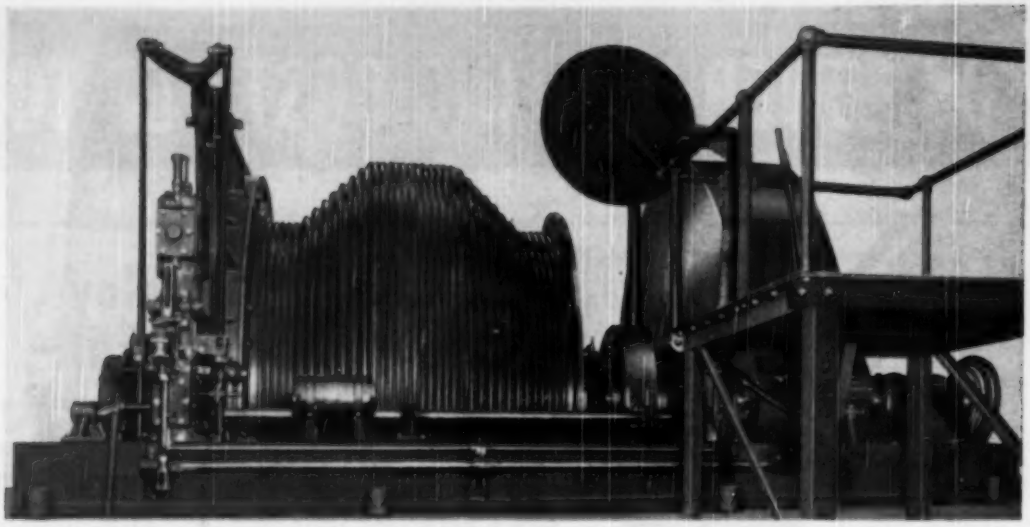
Carboloy's Mining Machine Bit—

with 8 important advantages

Not only do you get top carbide quality, top performance and top efficiency, but you get these 8 big plus advantages with this Carboloy mining machine bit:

- **Shank level with insert, for free flow of coal.**
- **Less shank steel to grind, yet adequate insert support.**
- **Less carbide to grind; faster grinding, greater tip economy.**
- **Smaller point affords less power consumption.**
- **Forged alloy steel shank resists bending, permits set screw clamping.**
- **No shoulders; set to any gauge size within range of uses.**
- **Maximum hold through combination of braze and mechanical holding.**
- **Approximately 50% greater thickness of insert at cutting edge.**

CARBOLOY®
CEMENTED CARBIDE
FOR GREATER MINING ECONOMY

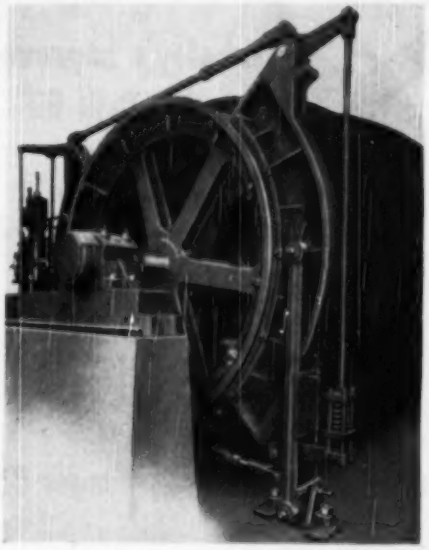


800 hp. Electric Hoist for balanced hoisting. Cast steel bi-cylindro-conical drum, built in four sections, is 9 to 12 ft. in diameter with machined grooves for 1⅛" rope. Dependable safety devices stop the hoist quickly but smoothly in event of power failure, and prevent overwinding, over-speeding, or starting in wrong direction. Post brakes on drum and auxiliary brake on pinion shaft operated by gravity-actuated air-brake engine. Single-reduction herringbone gears are completely enclosed in oil-tight welded steel guard. Illustration shows shop assembly without motor or electrical control equipment.

For LOW-COST Hoisting
in a West Virginia Coal Mine

In balanced hoisting at a well-known West Virginia coal mine the modern Vulcan Electric Hoist here illustrated and described combines high capacity with minimum power consumption. Its outstanding feature is the bi-cylindro-conical drum, cast in our own open-hearth steel foundry, which permits rapid acceleration without excessive peak load on the motor and assures minimum inertia of rotating parts during deceleration. Other features that make for fast, safe, hoisting at lowest ultimate expense are shown in the accompanying illustrations.

Your hoisting conditions may be entirely different but whatever they are Vulcan engineers can meet them with the right design—backed by experience acquired during a hundred years of continuous service to the mining industry. Correspondence regarding any present or prospective hoisting requirement is cordially invited. Illustrated bulletins on request.



Rear view showing air-operated parallel-motion post-type brake with pressure-graduating rig. The latter is an exclusive Vulcan feature which assures smoother, more uniform, graduated braking pressure than would otherwise be possible.

1849 VULCAN CENTENNIAL 1949

Vulcan Iron Works
WILKES-BARRE, PA., U.S.A.

Other Vulcan products include Alloasteel Sheaves, Cages and Skips, Shaking-Chute and Chain Conveyors and all types of Locomotives for underground and surface haulage. Write for illustrated bulletins.

Coal washer gets clean bill of health with . . .

AT A LARGE midwest mine, operators tried a conventional grease on the air valves of a coal washer. These valves control air flow used to agitate and separate coal from refuse. The grease did not seal the control valves against air leakage. Resulting loss of pressure threw air pulsations off beat, caused uneven operation and poor separation of refuse from the coal. Grease consumption ran high.

The washer was switched to a SUPERLA Grease recommended by a Standard Oil lubrication specialist. *This lubricant took the job in stride.* It prevented air leakage, kept bearing surfaces well lubricated. Throughout nine years of service it has kept valves in top working order and in excellent condition. Efficient separation of refuse from the coal has been the result.

A lot of tough lubricating jobs in your mine can be turned over to SUPERLA Greases. They will give you results comparable to what you can get with the highest type of special greases. They will prove as readily available and economical as ordinary cup greases.

SUPERLA
REG. U.S. PAT. OFF.
Greases

Discuss the advantages of SUPERLA Grease with a Standard Oil lubrication specialist. His headquarters are near your mine. How you can benefit from his services is explained at the right. Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

J. A. Grieve, lubrication specialist at Standard Oil's Decatur office, helped this midwest mine make important savings with SUPERLA Grease. He was close at hand, gave operators engineering service when they needed it.

There's a corps of Standard Oil lubrication specialists throughout the Midwest. You'll find one located near your mine. Through special training and a lot of practical experience, this man has gained a working knowledge of lubrication that can mean real savings for you. To obtain his services, simply contact the nearest Standard Oil (Indiana) office. Discuss with him the savings you can make with such outstanding products as:

STANOIL Industrial Oils—Here's *one* line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

SUPERLA Mine Lubricants—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

CALUMET Viscous Lubricants—On open gears and wire rope, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANDARD OIL COMPANY (INDIANA) STANDARD

BOWDIL

COAL CUTTER CHAIN and BITS

ONE-PIECE BIT HOLDER

BOWDIL BITS

BIT-CARRYING BODY SECURELY WELDED TO CHAIN

HEAVY SHOULDERS ON LINKS CARRY LOAD

SET SCREW LOCKS BIT HOLDER

LARGE HEAT-TREATED PINS

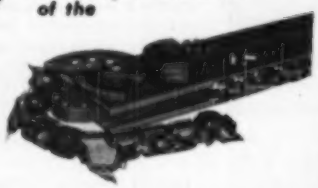
HEAVY-WALL HARDENED BUSHING

RADIAL TRACK GUIDES

DROP-FORGED LINK AND CONNECTOR

INGENIOUS RIVET LOCK

Made by the makers of the



STRONGEST CUTTER-BAR IN THE COAL INDUSTRY

BOWDIL BITS
for lowest cost per ton

THE BOWDIL COMPANY
CANTON, OHIO

Thermoid Research Gives Greater Flexibility and Wear-ability to New-Type Hose!

Thermoid has designed *Thermine* Air Hose especially for more efficient and economical use in drilling operations—from construction jobs to mining.

Increased flexibility allows greater freedom of movement and permits bending the hose easily around tight corners. A heavy synthetic rubber oil-proof tube is reinforced with heavy braided rayon cord. Smooth, extra-heavy rubber cover offers maximum resistance to abrasion and cutting by sharp rocks.

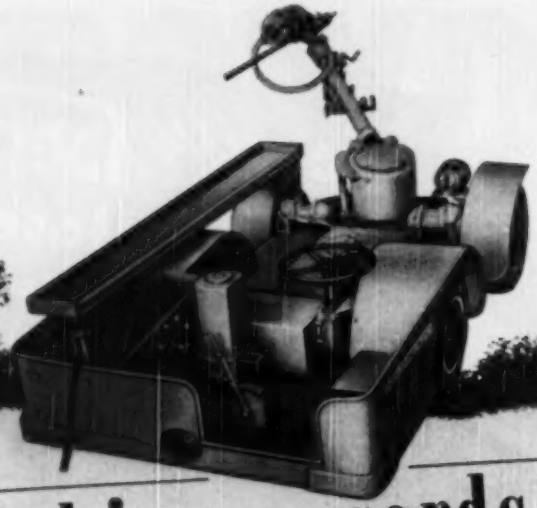
Thermine Air Hose is mandrel-built from ¼" to 1½" inclusive in 50 ft. lengths. Available at your nearest Thermoid Distributor.

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

For *Complete* Satisfaction *Specify* Thermoid!

Thermoid Company

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products



Breaking records in trackless mines

The CP One-Man Permissible Tramdrill combines great mobility with extremely fast drilling. Handles easily in narrow working places or entries, and seams as low as 30". All-electric, self-propelled, its electrically powered CP Drill Arm has all controls at the end of arm, within easy reach of operator.

Drills shot holes in coal up to 4½" in diameter, at any angle, and within four inches of roof or bottom. Also drills in rock, except sandstone.

Safety interlocking switch cuts off electric drill motors while tramming; prevents tramming while drilling.

Actual performance data on request. For specifications, write for copy of SP-3004.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

In strip mining, for shovel hoist and dragline, Roebling Preformed "Blue Center" Wire Rope with Independent Wire Rope Core is outstanding for small and medium size equipment . . . often preferred for 20- to 40-yard machines.
For rope research and developments that help you save...
Today it's Roebling!

YEAR BY YEAR, industry makes new and more stringent demands upon wire rope . . . and Roebling leads in developing types that meet these demands with utmost efficiency and economy.

Take Roebling Preformed "Blue Center" Wire Rope with Independent Wire Rope Core!

No finer rope has ever been made, and its basis is "Blue Center" steel—an exclusive Roebling development. Its high resistance to abrasion, shock and fatigue spells long life . . . To this, Roebling *Preforming* brings the further advantages of new handling ease and improved performance . . . And the addition of I.W.R.C. assures top resistance to operating pressures and provides increased rope strength.

Roebling makes a wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebling Field Man recommend the best rope for low-cost performance on each of your installations.

ROEBLING

A CENTURY OF CONFIDENCE

Atlanta, 934 Avon Ave. ★ *Boston*, 51 Sleeper St. ★ *Chicago*, 5525 W. Roosevelt Road ★ *Cincinnati*, 3253 Fredonia Ave. ★ *Cleveland*, 701 St. Clair Ave., N. E. ★ *Denver*, 4801 Jackson St. ★ *Houston*, 6216 Navigation Blvd. ★ *Los Angeles*, 216 S. Alameda St. ★ *New York*, 19 Rector St. ★ *Philadelphia*, 12 S. Twelfth St. ★ *Portland*, 1032 N. W. 14th Ave. ★ *San Francisco*, 1740 Seventeenth St. ★ *Seattle*, 900 First Avenue S.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON 2, NEW JERSEY

KOEHRING 2½-yard 1005 has plenty of power, stamina and weight-stability to hold solidly when digging into the toughest rock banks. It's *specially-engineered* for heaviest 2½-yard service.

Every operating assembly, from the 1005's cast-alloy crawler shoes to boom point, is extra-heavy-duty to meet the typical strains of 2½-yard digging. Crawler frames and axles are separate units from the carbody . . . provide "give" in the excavator base. Crawlers are easily moved in for shipping clearance. Positive traction-brake steering provides exceptional maneuverability. Center pivot bearings protect vertical traction shaft from horizontal stresses . . . husky hook rollers resist vertical stresses. Compact upper machinery, on one-piece turntable, is simple, accessible.

Big 37", double-band swing clutches are self-equalizing. Clutch housings constantly rotate, dissipate heat, give smooth, cool operation. Entire machine is 100% mechanical . . . no complicated hydraulic or air systems requiring service specialists. Adjustments are easily made by operator.

Operators also like the way the 1005's big, 48" power clutch retains "feel" of load . . . with only 1/10th the normal lever pull. Another Koehring feature, instantaneous dipper trip, works every *time* . . . saves spillage . . . speeds loading for top yardage output.

This heavy-duty Koehring 1005 is diesel powered, can also be furnished with electric motor. Quickly converts from shovel to dragline, clamshell or lift crane. Safely lifts up to 79½ tons . . . boom sections up to 120', plus 30' jib. Other Koehring excavator sizes: ½-yd. 205, ¾-yd. 304, 1½-yd. 605.

KOEHRING COMPANY
MILWAUKEE 10, WIS.

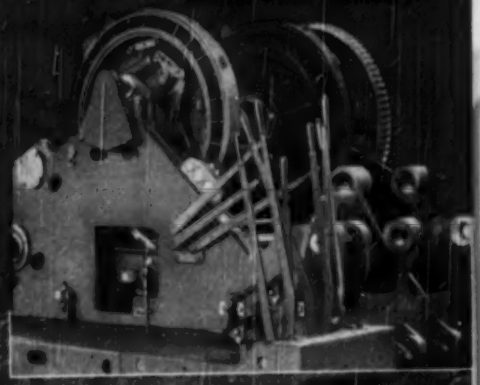
SUBSIDIARIES: JOHNSON • PARSONS • KWIK-MIX

FOR Power Strength Weight

- EVERY ASSEMBLY HEAVY, POWERFUL . . . ENGINEERED SPECIALLY FOR 3½-YARD EXCAVATOR SERVICE
- PLENTY OF WORKING WEIGHT, BEHIND POSITIVE CHAIN CROWD FOR DIGGING INTO ROCK BANKS
- HEAVY BOX-DESIGN BOOM, MASSIVE SHOCK ABSORBER MOUNTING, DOUBLE DIPPER STICKS, TORSION-RESISTANT SHIPPER SHAFT, ALL ABSORB STRESSES OF FAST ROCK HANDLING
- SAFELY LIFTS UP TO 7½ TONS . . . boom available in 120', plus 30' jib

- LIGHT-LEVER FULL SIZE HIGH POWER CLUTCH . . .

Power-actuated clutch takes only 5 lbs. on the pull required to set a manual clutch of comparative size . . . yet delivers "feel" of full, direct engagement and a smooth power surge . . . automatically adjusts itself for best operation. Power clutch easily converted to be manually operated . . . [illegible]



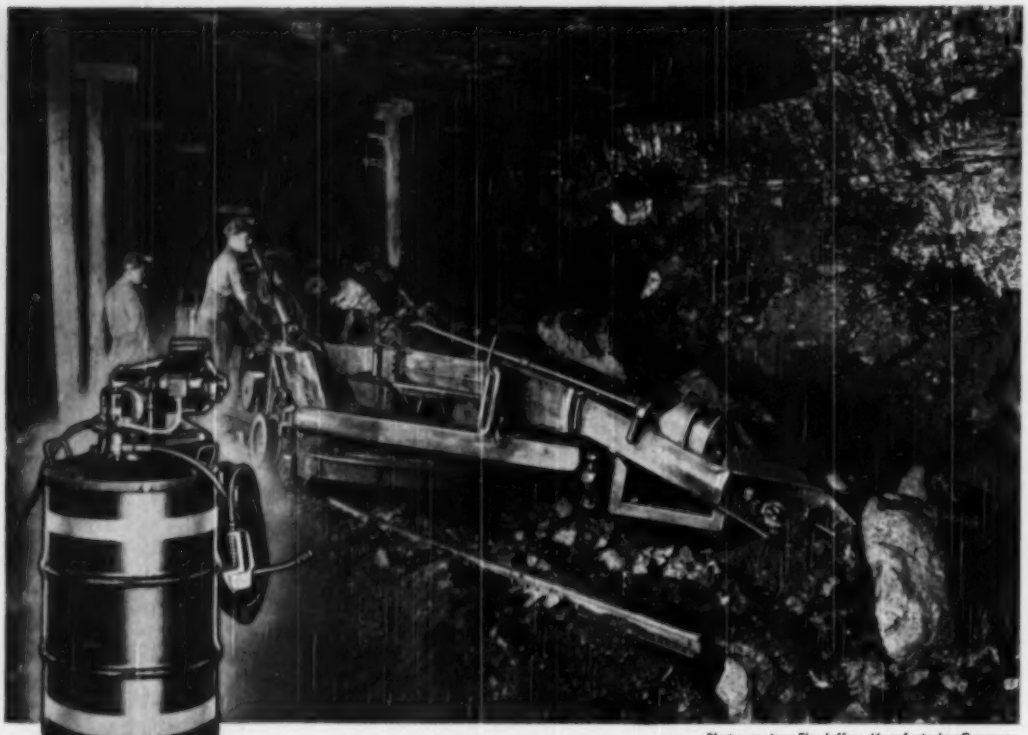


Photo courtesy The Jeffrey Manufacturing Company

Save On Your Operating Costs!

WITH ALEMITE MECHANIZED LUBRICATION

One of the best, proven ways to cut your operating costs is to protect expensive mining machinery against coal dust and dirt. In shaft or strip mining, Alemite Lubrication methods cut repair costs, keep lubricants free from contamination and save costly man-hours by faster, easier *mechanized* lubrication.

Vital moving parts of every mining machine get the positive, regular lubrication they need for dependable, trouble-free operation. From-barrel-to-bearing, Alemite equipment and methods assure safe, fast handling and application of grease and oil—without waste or mess. Refinery-sealed lubricants are kept *clean*, unexposed to dirt and dust and untouched by human hands!

Alemite pumps can be powered with air or electricity, above or below ground. Alemite mechanized equipment provides rapid, dependable lubrication for your mine cars and machinery at minimum cost.

WRITE NOW for complete details on how to cut your operating costs with Alemite lubrication methods from-barrel-to-bearing. Alemite, Dept. E-50, 1850 Diversey Parkway, Chicago 14, Illinois.

ALEMITE

Lubrication Methods that Cut Production Costs

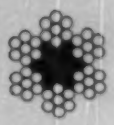
Alemite Cuts Costs 3 Ways...

1. Transferring Lubricants without mess or contamination! Cuts man-hours 63% per 100 lbs. of lubricant transferred.

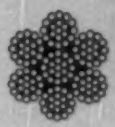
2. Loading Grease Guns rapidly, completely! Saves 3¾ man-hours per 100 lbs. of grease loaded into hand guns.

3. Applying Lubricants quickly, safely. Cuts 23.9 man-hours per 100 lbs. of lubricant applied to bearings.

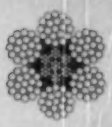
Whatever the job



6x7 rope is made with 7 wires in each of 6 strands around a fiber core or a steel core. It may be bright or galvanized steel, stainless steel or monel metal. Uses are for haulage, guying, sand lines, core barrel lines, rigging, controls, etc.

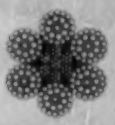


7x19 is made with 7 strands of 19 wires each, one strand forms the core. It is widely used for corrosion-resisting wire rope of galvanized steel, stainless steel and monel metal. Widely used for aircraft controls and for miscellaneous hoisting and controls.

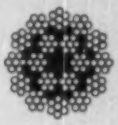


6x19 classification is made with wire combinations varying from 16 to 26 wires in each of 6 strands. Supplied *PRE*formed or non-*PRE*-formed, Lang Lay or Regular Lay, with fiber core, or steel core in bright and galvanized steel, stainless steel and monel metal. It is one of the most widely used ropes for general hoisting, cranes, excavating equipment, haulage, mining, logging and rotary drilling. Illustrated is a cross-section of 6x19 filler with I.W.R.C.

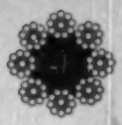
select the right wire rope for your equipment from



6x37 group has various types with wire combinations ranging from 26 to 46 wires in each of 6 strands. Supplied *PRE*formed or non-*PRE*-formed, Lang Lay or Regular Lay, with fiber core or steel core. It is extremely flexible and has many uses for hoists, ladle cranes, coal cutting machines, winches, dredges, excavating equipment, etc. Illustrated is a cross-section of 6x41 I.W.R.C.



18x7 is made as illustrated with 18 strands of 7 wires each and supplied *PRE*formed. It is a non-rotating "Kilindo" rope made by combining two opposing lays of rope. Its principal use is for hoisting with a single line to overcome rotating or spinning of the load. It is desirable for small shop and warehouse electric hoists, and for sewer, subway and mine shaft work.



8x19 is an extra flexible rope made in various wire combinations. It is used in iron and special traction grades for passenger and freight elevator service, and in Monarch Whyte Strand Improved Plow Steel for many and varied purposes where the rope is not subjected to heavy crushing loads. Illustrated is 8x19 Seale Special Traction Elevator Rope.

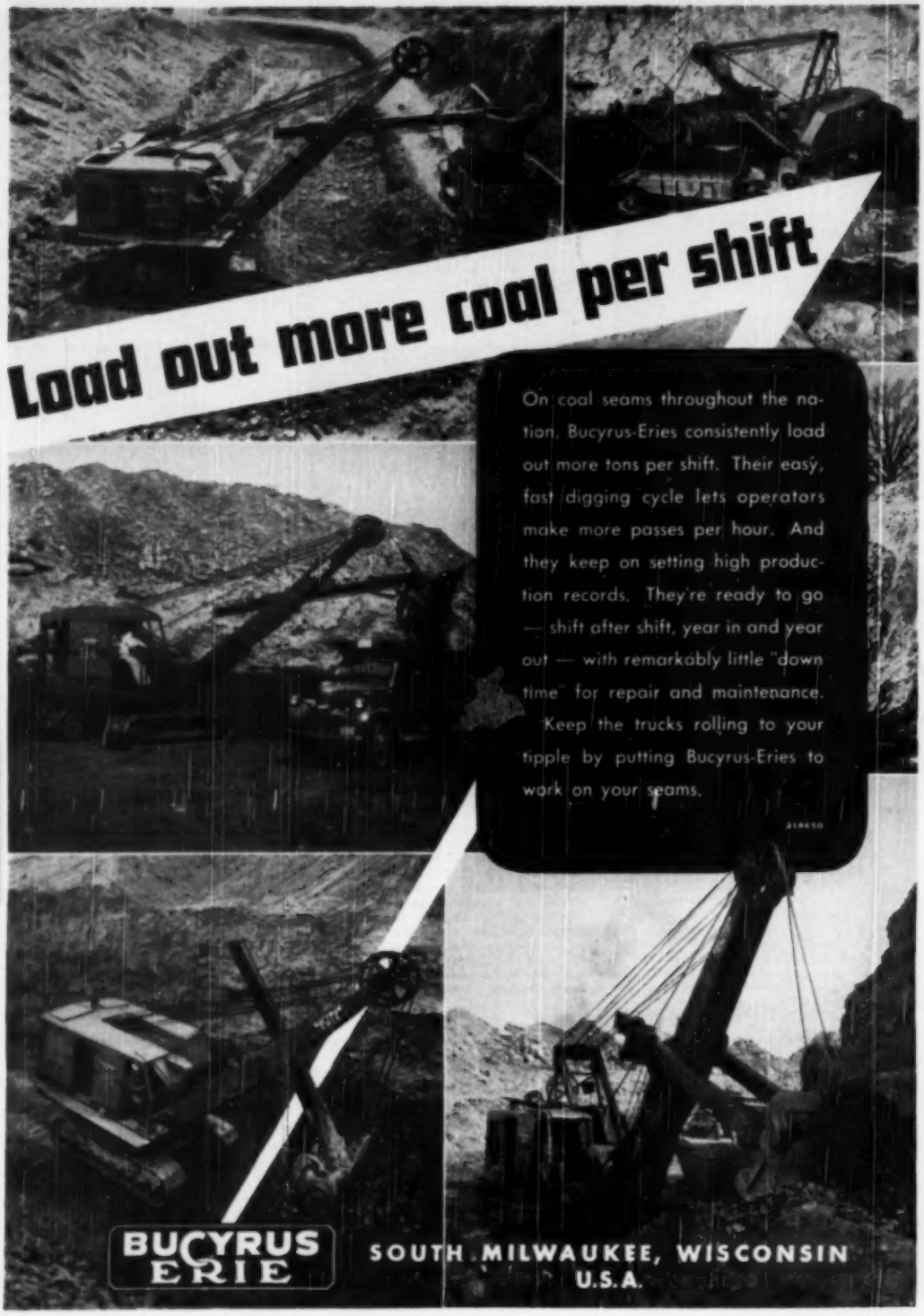
A thousand and one
WIRE ROPES
made by
MACWHYTE

Putting the right wire rope on your equipment puts dollars in your pocket

Perhaps you have several uses for wire rope. Perhaps there are several types of rope you could use. But for better service, lowest operating cost, you should get a specific recommendation for each job. Tell us what equipment you have, how you use it, and the size and type of rope you are now using. Take advantage of our specialized wire rope experience with all types of equipment. Get specifications for the correct rope to use on each machine you have. Just call a Macwhyte distributor or write direct to Macwhyte Company, Service Department, Kenosha, Wisconsin.

MACWHYTE WIRE ROPE

MACWHYTE COMPANY 2331 Fourteenth Avenue, Kenosha, Wisconsin Manufacturers of Monarch Whyte Strand PREformed, Internally Lubricated Wire Rope, ATLAS Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope. Catalog on request. Mill Depots: New York • Pittsburgh • Chicago • Minneapolis Fort Worth • Portland • Seattle • San Francisco • Los Angeles


Load out more coal per shift
On coal seams throughout the nation, Bucyrus-Eries consistently load out more tons per shift. Their easy, fast digging cycle lets operators make more passes per hour. And they keep on setting high production records. They're ready to go — shift after shift, year in and year out — with remarkably little "down time" for repair and maintenance.
Keep the trucks rolling to your tipple by putting Bucyrus-Eries to work on your seams.
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2-Speed Truck

AXLES pay for Themselves Over and Over

Eaton 2-Speed Axles give your trucks added utility, improved performance, faster operating speed, more pulling power. They effect important savings in operating and maintenance costs. Eaton 2-Speed Axles provide the right gear ratio for road and load conditions. They permit engines to run in the most efficient and economical speed range, reduce stress and wear on vital vehicle parts and actually make trucks last longer. Eaton 2-Speed Truck Axles are available for most trucks of the 1 ½-ton class and larger. Ask your truck dealer how they will more than pay for themselves in your operation.

Axle Division

EATON MANUFACTURING COMPANY

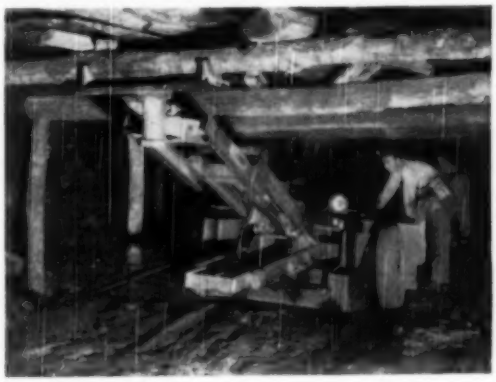
CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

If you use BOLTS or BARS or BOTH

–one Baker machine can do the job

The BAKER Timbering Machine, which has successfully mechanized the erection of timbers, is now available with a Drilling and Bolting Head—making it possible to save time on *Roof Bolting* and *Timbering* with the same machine. This machine is battery powered and pneumatic rubber tired. The boom has a 90° swing to either side, and permits operation in seams as low as 36".



TIMBERING

Baker Timbering machine saves at least 50% of the labor costs and eliminates the hazards of manual timbering. Also provides an efficient means of transporting and sawing timbers. Available with or without Drilling and Bolting Head.

Drill and Bolting Head on Portable Mount also available

BOLTING

With "V" Type Drilling and Bolting Head, the same machine makes a real saving in roof bolting —Full hydraulic power and control means constant pressure on drill feed and easy positioning with relation to roof or floor. Drill and torque wrench combined in single head.

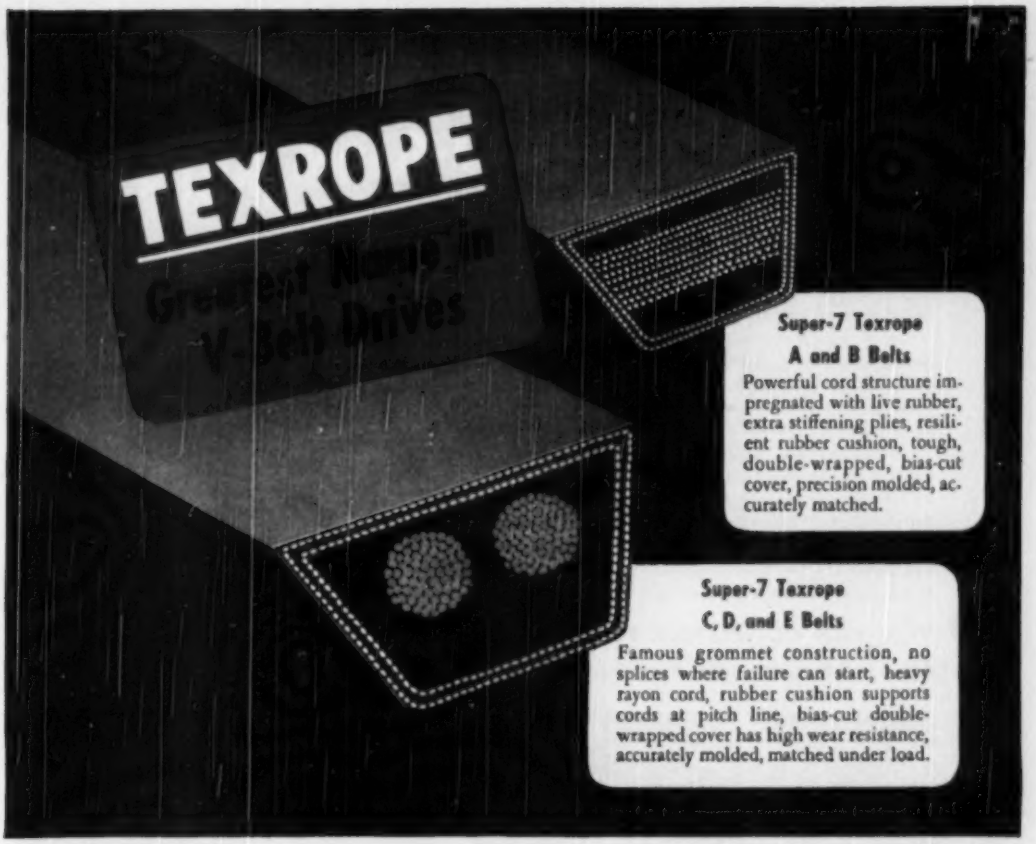
Baker Mine Tractor, Timbering Machine and Trike have U. S. Bureau of Mines approval as permissible equipment.

Write for complete information

Manufactured by
THE BAKER-RAULANG CO.
1213 West 80th Street • • • Cleveland 4, Ohio

Exclusive Coal Mine Representatives
J. H. FLETCHER & CO.
Chicago, Illinois • • Huntington, W. Virginia

Baker MINE EQUIPMENT



Super-7 Texrope
A and B Belts

Powerful cord structure impregnated with live rubber, extra stiffening plies, resilient rubber cushion, tough, double-wrapped, bias-cut cover, precision molded, accurately matched.

Super-7 Texrope
C, D, and E Belts

Famous grommet construction, no splices where failure can start, heavy rayon cord, rubber cushion supports cords at pitch line, bias-cut double-wrapped cover has high wear resistance, accurately molded, matched under load.

LONG LIFE FOR YOUR DRIVES

YOU GET MORE than good belts when you standardize on *Super-7 Texrope* V-belts in your plant. You also get the benefit of the greatest V-belt experience in the world. This means you are sure of exactly the right drive for longest life on your job. *Texrope* Drive Department of Allis-Chalmers originated the multiple V-belt drive and there are more *Texrope* multiple V-belt drives in operation than any other make.

High Capacity Belts

These belts have extra strong cords, special rubber cushion and tough neoprene cover to give them 40% greater capacity than standard belts at proportionately higher price. Recommended only for applications where space is limited or other special conditions demand a heavier duty belt. Made in A, B, C, D and E sections.

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Get everything you need for your V-belt drives . . . new and replacement V-belts, standard and variable speed sheaves and speed changers . . . from one reliable source. 144 page *Texrope* Pre-engineered Drive manual covers 90% of requirements. Get your copy today from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956.

Texrope and *Super-7* are Allis-Chalmers trademarks. *Super-7 Texrope* V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

ALLIS-CHALMERS, 968A SO. 70 ST. A-3021
MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

It pays to check CRANE first for all piping equipment needs

BETTER SUITED TO MORE MINE SERVICES

Unique design . . . and choice of materials . . . makes Crane Diaphragm Valves well suited to a variety of mine services. Being packless, they eliminate stem leakage. Their Y-pattern body minimizes resistance to flow. They are easy to operate . . . require less torque and fewer turns . . . to open or close fully.

Crane separate disc-diaphragm construction assures safer, more dependable valve performance. Neoprene diaphragm lasts longer because it is used only to seal the bonnet—not for seating purposes. Separate seating disc provides tight closure . . . minimizes loss of fluids even should diaphragm fail.

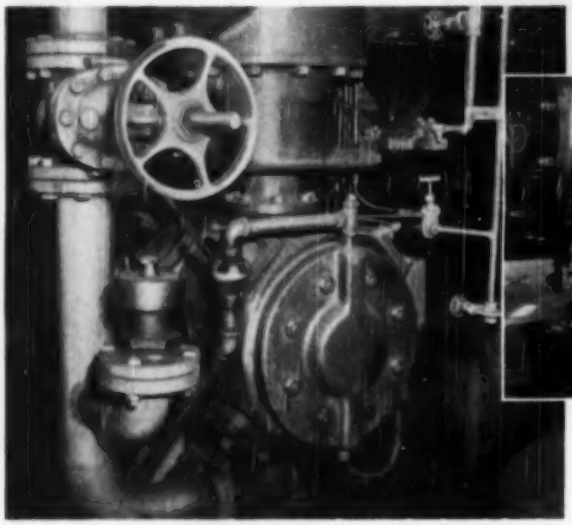
Crane Diaphragm Valves are Neoprene-lined for conveying corrosive mine waters, sludges, slurries and fluids containing abrasives. Unlined valves are highly suited for compressed air and other common mine services. Send for Circular AD-1761. CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.

Branches and Wholesalers Serving All Industrial Areas

WORKING PRESSURES:

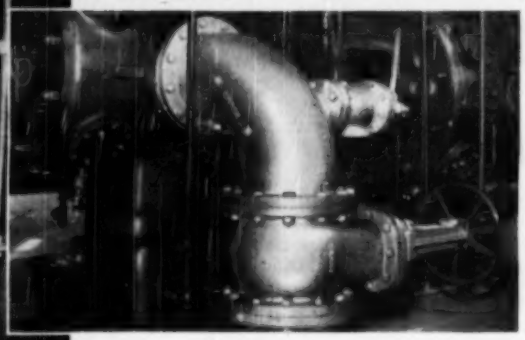
up to 150 pounds water, oil, air, or gas; 180° F. max. temp. Sizes up to 6-in. Screwed or Flanged ends

YOU CAN COMPLETELY EQUIP ANY MINE INSTALLATION ON ONE PURCHASE ORDER TO CRANE

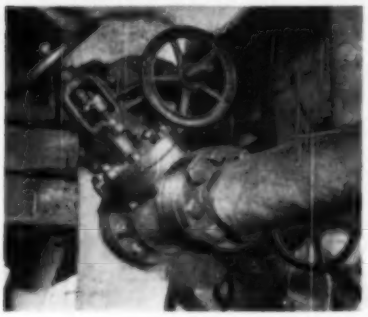


AIR LIFT CONTROL *to secondary cone in coal preparation plant. Crane equipment includes gate valves, globe valves, clamp gates and flanged fittings.*

COMPRESSOR IN COPPER MINE *power house featuring Crane iron body double disc gate valve and flanged fittings.*



LINES TO CLOSED FEED *hot water heater showing Crane 4-in. steel gate valves.*



EVERYTHING FOR EVERY PIPING SYSTEM

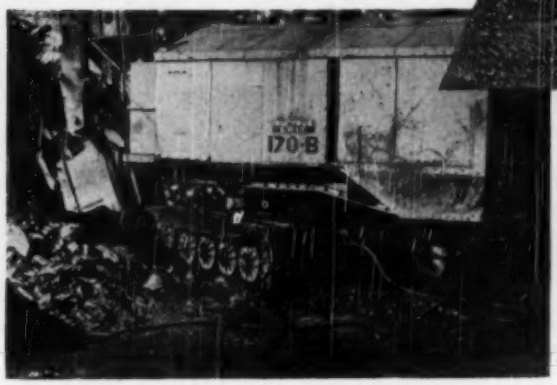
CRANE

VALVES • FITTINGS • PIPE • PLUMBING AND HEATING

back up your shovels with

TOUGH, MOLD-CURED HAZACORD

IT'S A TOUGH LIFE that electric shovel cable has to face. That's why Hazacord Shovel Cable is specially designed and constructed with the extra strength and durability that pays off in this severe service. Take Hazacord's outside protection—the Hazaprene ZBF Sheath. It's a double-layer, reinforced sheath that's mold cured under pressure to form a dense, homogeneous wall with tire-tread toughness and resiliency. Compounded with neoprene, it's unaffected by oil, acids, water, and sunlight. Yet with all the life-extending toughness you get with Hazacord Shovel Cable, ample flexibility for easy handling is retained.

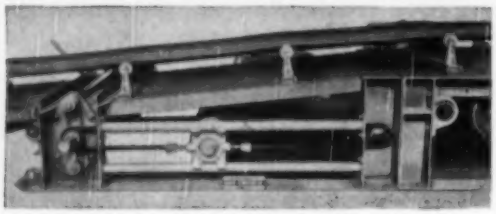


TO KEEP SHOVELS WORKING Hazacord is designed-for-the-job with many "inside" features as well that give you *extra protection* against cable failure. Long-lived, electrically stable, heat-resisting Performite insulates each conductor; permanently colored Okobestoprene Tape (a non-fibrous asbestos-neoprene material developed by Okonite) is precision wrapped around each insulated conductor. It seals into a flame- and moisture-resistant, non-rotting protective covering that also provides flexibility and permanent circuit identification. For moisture tightness at cable ends, and added cushioning qualities, Hazaprene fillers are used in conductor interstices instead of ordinary fibrous material.

For full information on Hazacord's many features that are delivering money-saving service in more and more operations—ask your Hazard representative to call, or write Hazard Insulated Wire Works, Division of the Okonite Company, Wilkes-Barre, Pa.

HAZARD cables for every mining use

WHATEVER YOU NEED GET IT "OFF-THE-SHELF"



INTERNAL TAKEUP

Located directly back of the drive. Handles 10' of belt slack. Operated by reversible ratchet-wrench working on gear reduction to minimize manual effort. Double-acting pawl prevents backing-up. Worked from either side of conveyor.

TAIL SECTION

Telescopic type to provide tail takeup action. Easy to clean out—no steel work under tail pulley. Has transverse cover to protect pulley, bearings *and belt*. Strong enough so you can rest a feeder on it.

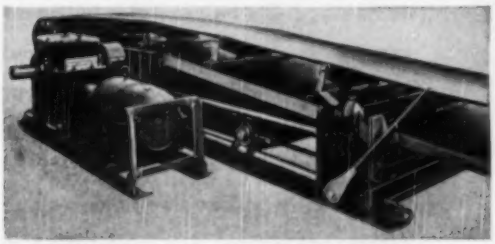
IN A MINE CONVEYOR— AT HEWITT-ROBINS!

Shipped Complete—Right Out of Stock— from Passaic, N. J., and Charleston, W. Va.

Every mine is different—every mine has different underground conveying problems. That's why Hewitt-Robins makes not one but *three* different types of mine conveyors. That means mine operators can match Hewitt-Robins equipment against their own *specific requirements* and get exactly what they need, right out of Hewitt-Robins warehouses in Passaic and Charleston. Not just the conveyor machinery itself, but belt, motors, reducers and drives!

Hewitt-Robins *Types I* and *IS Mine Conveyors* have *internal* drive for level, *up*hill or *down*hill operation; in 26", 30", 36" widths, lengths up to 3000 feet or more if needed. *Type H* has head drive for level or *up*hill operation; in 26" and 30" widths, lengths up to 2000 feet.

Intermediate Sections are standard, fit all types, simple to assemble because both ends are identical and need no "matching up." Available in 8′ and 10′ lengths. Also available are standard 12′ Intermediate Sections—channel construction, bolted connections—for permanent 30", 36" and 42" wide main haulage installations, using the standard terminals.

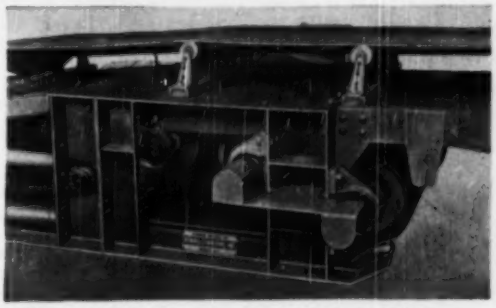


UNIFIED DRIVE SECTION

Motor, reducer and controls mounted on a single base—skid-designed for easy moving about. Can be located on either side of the conveyor. Drive reversible—incoming for men and material, outgoing for high output of product.

You can choose single or tandem pulley drive, internal or tail takeup, the length and belt width that fits your particular mine . . . but in every case you get famed Ajax® heavy-duty belting, Hewitt-Robins ball-bearing, one-shot lubrication idlers, lagged pulleys for maximum power transmission . . . over half a century of engineering and manufacturing know-how!

Remember—*only Hewitt-Robins* makes both machinery and belt; *only Hewitt-Robins* is willing and able to take unified responsibility for successful installation and operation! For complete specifications—or out-of-stock delivery—write Hewitt-Robins Incorporated, 1010 Pennsylvania Ave., Charleston, W. Va., or 270 Passaic Ave., Passaic, N. J.



SINGLE OR TANDEM DRIVE

Hewitt-Robins Mine Conveyors come equipped with *both* single and tandem pulley drive elements. Provide ample horsepower for lift and length up to the very limits of belt capacity. Reeving of belt handles level, uphill or downhill service requirements.

HEWITT-ROBINS
MINE CONVEYORS

HEWITT-ROBINS HR **INCORPORATED**

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS • FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS • RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS • TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

"I'm putting *by saving*

Business men today, shouldered with the responsibility of operating at a profit, are realizing that the old concepts of profits on capital investment are as obsolete as the mule in coal mining. Steadily rising man-hour costs, following increased living costs, have overtaken all other costs of doing business. The trend has been so rapid that almost any investment in equipment is justified in reducing man-hour costs.

SANFORD-DAY
KNOXVILLE

$50,000 in mine cars, *8 man-hours a day...*"

A Fundamental Analysis of Capital Investment vs. Cost Savings

What will my capital investment be over a period of 20 years, to install modern S-D, 1-2-3 "Automatic" Cars? Answer—Exactly nothing, even if you save only 8 man-hours a day. Here are the figures:

1—$15.00 a day, 266 days a year, equals $4,000.00 annual direct cost.

2—This $4000 annually will pay for $50,000 in SD Automatics over 20 years as follows:

$2500 per year for depreciation.

$1500 per year for 6% interest on average outstanding Balance of $25,000.

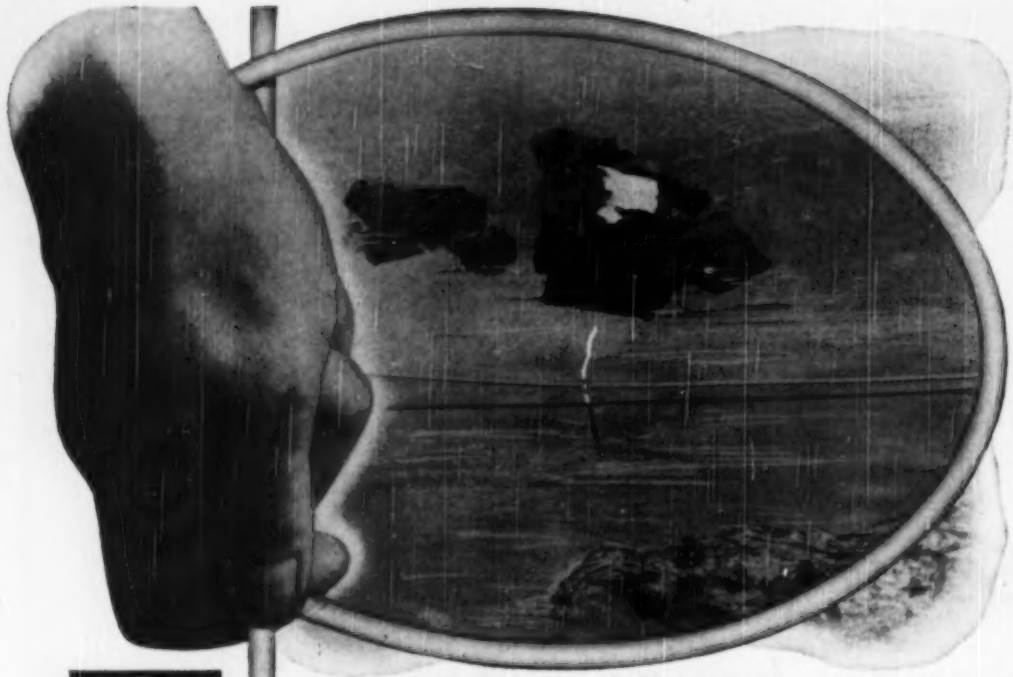
3—Therefore $15.00 savings per day pays for $50,000 worth of mine cars, and $50,000 will buy 75 to 100 S-D 1-2-3 "Automatics."

These figures, of course, are fundamental. Actual change-over installations (change from out-of-date cars to modern S-D 1-2-3 "Automatics") always prove savings that will multiply these basic figures many times.

No other mine car can give you all the advantages of S-D 1-2-3 "Automatics."

I R O N W O R K S

T E N N E S S E E



Plastic Reinforced Primacord is recommended for all "down" lines. Use Plain Primacord for surface or "ground" lines. To make the most effective hook-up, use a simple clove hitch in the *ground* line, as shown in these three photographs.

The twin loops have been folded over to form a hole.

Pass the Plastic Reinforced Primacord through this hole and draw the two ends up *tight*.

Tough going calls for

PLASTIC REINFORCED PRIMACORD

Surface water, sludge and mud need not delay your loading operations if you use the new Plastic Reinforced Primacord for the "down" lines. The seamless plastic cover is *waterproof* and resists penetration even at high pressures. It is also smooth, tough and resistant to the action of the acids commonly encountered. Sub-zero cold and high summer heat do not affect Plastic Reinforced Primacord. Its weight is about the same as Plain Primacord and its tensile strength is greater than that of Wire Countered Primacord.

Use Plastic Reinforced Primacord in deep, wet holes, in preloading, pipe line river crossing, horizontal holes, marine work, coyote tunnels and sleeper shots for seismograph work.

P-2

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONN.

PRIMACORD- BICKFORD DETONATING FUSE • SAFETY FUSE SINCE 1836

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

MAY, 1950

IVAN A. GIVEN, EDITOR

Wanted: Boldness

FROM NOW ON, it appears that coal will be receiving an increasing number of invitations to place itself under the "protection" of the federal government. In fact, a number of operators, in their gloomier moments, are putting forward the idea that the industry should ask for such protection in the hope that the terms will be more favorable, rather than wait for control to be imposed from the outside. All this stems from concern for the future as a result of the situation the coal industry faced when work resumed early in March.

With natural gas reaching to the far corners of the United States; with the railroads playing a major role in the drive to replace the product from which they draw a major part of their revenue with a fuel moved largely by pipe lines and tankers; with cheap foreign oil flooding in to augment the pressure of domestic production; and with coal suffering from the effects of years of forced cost increases and market disturbances flowing out of strikes and production limitations, it is difficult to generate wild enthusiasm over the industry's immediate prospects. But does it necessarily follow that coal has no choice but to go along with those who see in its present difficulties a new chance to extend government control over another segment of the country's economy?

With competition preparing to put on the pressure in a new phase of the competitive cycle, coal would have materially benefited from a comfortable backlog of business and a reasonable margin of profit. Thanks to Lewis, however, with an assist from Truman, coal's margin of advantage was abruptly and sharply reduced at a time when every effort should have been made to increase it. The emergency is immediate and pressing, but, with full allowance for the effects of variation in impact by regions and by individual organizations, coal cannot be considered as counted out as long as: (1) it has the will to fight; (2) it has a real opportunity for achieving improvements in cost, quality and service to the consumer.

Since coal has only recently demonstrated once again that it has the will to battle with the odds against it, and since real cost, quality and service opportunities still exist, perhaps boldness in planning should be the order of the day rather than a mere rearguard action. For instance, if the bituminous and anthracite industries were to set aside 10c per ton in 1950 for research, the resultant fund would make possible some really fast and greatly expanded results in the field of promoting coal use. To back up research facilities, perhaps such suggestions as a coal-financed corporation for developing, manufacturing, merchandising and servicing coal-burning equipment for the smaller user should receive real study. And if there ever was need for joint action between coal, railroads, labor and others with a stake in the prosperity of the industry it is now. Revival and strengthening of cooperative machinery should, therefore, be a No. 1 objective.

At the mines, where cost and quality margins are really made, there is equal room for forward-looking planning and investment. One is as vital as the other, and top and operating management have equal responsibilities in bringing about the necessary results. There are, of course, practical limits to the gains that can be made in cost and quality, but, with a minority of exceptions, those limits are a long way from being reached. Thus, the field is still wide open in mining as well as in marketing. Boldness and aggressiveness on both fronts would, at the worst, leave coal in no fundamentally different position. And certainly if the tide is to be permanently turned, boldness and agressiveness are absolutely necessary.

HERE'S A MINER answering safety questions. He and others like him will tell you . . .

What Miners Think About Safety

This Is a Plan for Getting the Answers

It Shows That . . .

- Miners Have Good Ideas About Safety
- They Like to Share in Planning
- They'll Help Make the Rules Work

And That Asking Their Help . . .

- Spurs Interest in Safety
- Creates Confidence in Management
- Fosters Teamwork

BALLARD PLUMMER, safety director for the Princess Elkhorn Coal Co., David, Ky., gets strong support from his management in his search for new and better ways to make coal mining safer. About a year ago, he broadened his search for the answers to some safety questions. The story of what he did, how he did it and what his company and his miners gained comes out in the following questions and answers. *Coal Age* asked the questions. Mr. Plummer, of course, provided the answers.

COAL AGE—Mr. Plummer, about a year ago your company president, Mr. David Francis, wrote a letter to your miners and tipple and shop men asking some questions about safety. We've heard you learned a lot about what your men think and that you also picked up some ideas about how to make your mines and surface plants safer.

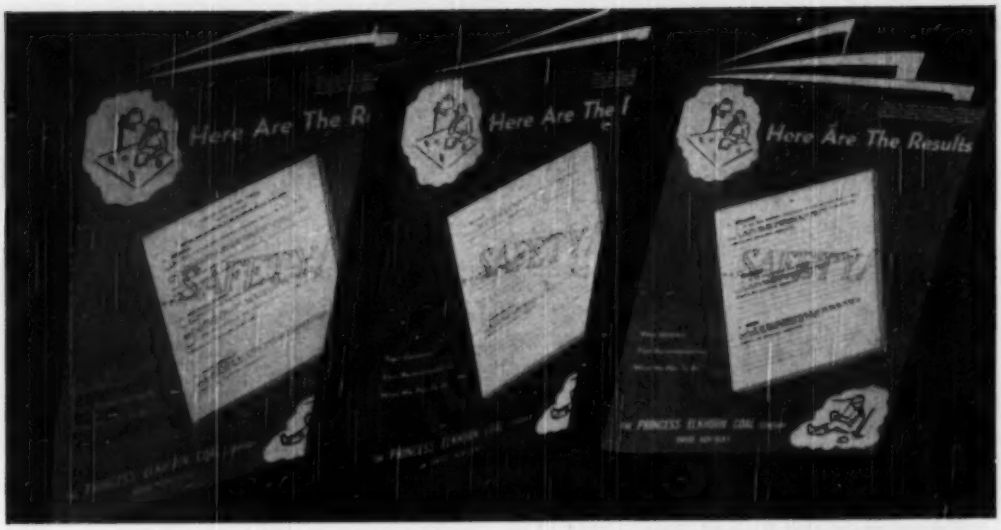
As far as we know, nobody else in the industry has done just what your management did. We think more people ought to know about your plan and we'd like to pass the word along. Will you tell us just what you did, how you did it and what results you got?

MR. PLUMMER—Sure, glad to give you all we have. But first let me tell you a little about the background of our safety program.

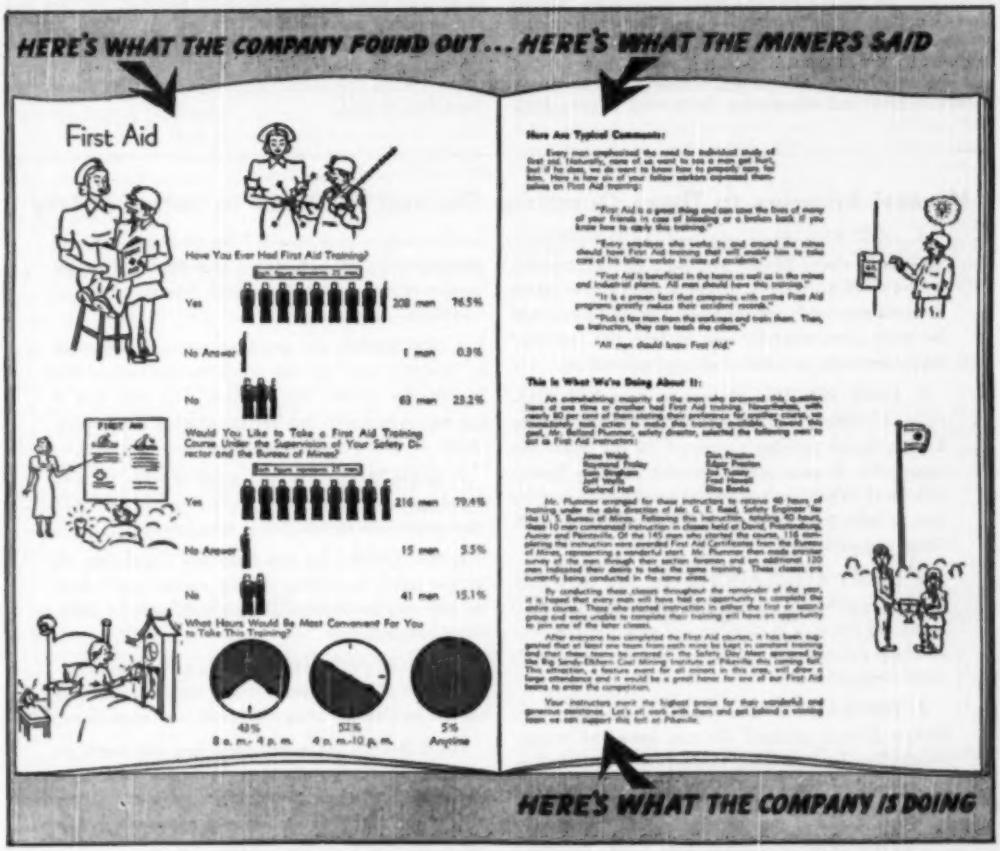
We operate two mines in the Elkhorn seam averaging 38 in thick. Our mines are mechanical and we employ about 600 men with an average annual tonnage of 725,000 tons and a man-hour exposure of about 897,000. Our frequency and severity rates are far better than the average for the field. Both of our mines have received safety awards from the Big Sandy-Elkhorn Coal Mining Institute and the Joseph A. Holmes Safety Association.

CA—Fine. That fills in the background for your safety program very nicely. But what made you decide to poll your workers?

MR. PLUMMER—Well, we'd worked hard on safety for a long time and we'd made a pretty good record. Most of the things we did, though, were things we—

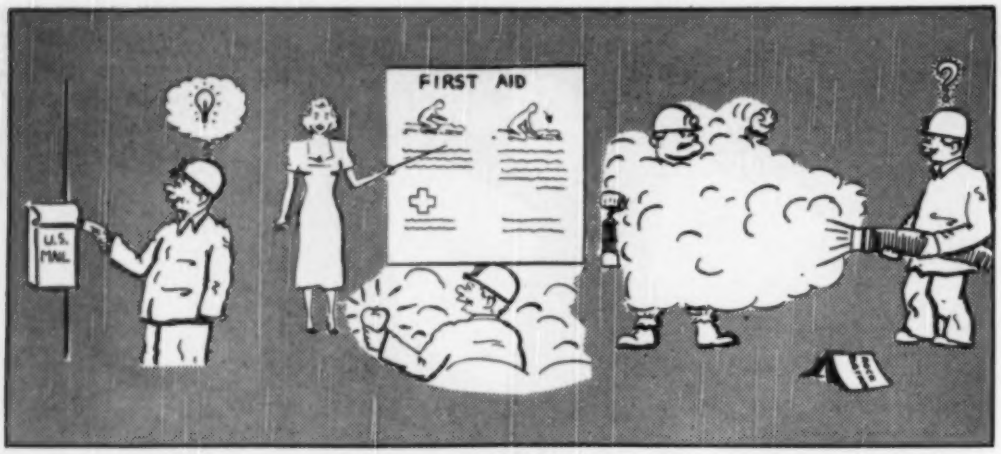


THESE BOOKLETS were printed after miners' answers were added up.


HERE'S WHAT THE COMPANY FOUND OUT... HERE'S WHAT THE MINERS SAID
First Aid
Have You Ever Had First Aid Training?
Each figure represents 20 men
Yes
208 men
76.5%
No Answer
1 man
0.3%
No
63 men
23.2%
Would You Like to Take a First Aid Training Course Under the Supervision of Your Safety Director and the Bureau of Mines?
Each figure represents 20 men
Yes
216 men
79.4%
No Answer
15 men
5.5%
No
41 men
15.1%
What Hours Would Be Most Convenient For You to Take This Training?
40%
8 a. m.- 4 p. m.
52%
4 p. m.-10 p. m.
5%
Anytime
Here Are Typical Comments:
"First Aid is a great thing and can save the lives of many of your friends in case of bleeding or a broken back if you know how to apply this training."
"Every employee who works in and around the mines should have First Aid training that will enable him to take care of his fellow workers in case of accidents."
"First Aid is beneficial in the home as well as in the mines and industrial plants. All men should have this training."
"It is a proven fact that companies with active First Aid programs greatly reduce their accident records."
"Pick a few men from the workmen and train them. Then, as instructors, they can teach the others."
"All men should know First Aid."
This Is What We're Doing About It:
An overwhelming majority of the men who answered this question have at one time or another had First Aid training. Nevertheless, with nearly $60 per cent of them stating their preference for another course, we immediately took action to make this training available. Toward this goal, Mr. Bedford Plummer, safety director, selected the following men to act as First Aid instructors:
Jesse Webb
Raymond Farley
Sam Bingham
Jeff Wells
Garland Hall
Don Preston
Elbert Preston
Joe Turner
Fred Howell
Elva Banks
Mr. Plummer arranged for these instructors to receive 40 hours of training under the able direction of Mr. G. E. Read, Safety Engineer for the U. S. Bureau of Mines. Following this instruction, totaling 90 hours, these 10 men commenced instruction in classes held at Bland, Prestonsburg, Auxier and Paintsville. Of the 145 men who started the course, 116 completing the instruction were awarded First Aid Certificates from the Bureau of Mines, representing a wonderful start. Mr. Plummer then made another survey of the men through their section foremen and an additional 120 men indicated their desire to take the same training. These classes are currently being conducted in the same areas.
By conducting these classes throughout the remainder of the year, it is hoped that every man will have had an opportunity to complete the entire course. Those who started instruction in either the first or second group and were unable to complete their training will have an opportunity to join one of the later classes.
After everyone has completed the First Aid courses, it has been suggested that at least one team from each mine be kept in constant training and that these teams be entered in the Safety Day Meet sponsored by the Big Sandy-Elkhorn Coal Mining Institute at Pikeville this coming fall. This attraction, a feature event for all miners in this area, will draw a large attendance and it would be a great honor for one of our First Aid teams to enter the competition.
Your instructors merit the highest praise for their wonderful and generous assistance. Let's all work with them and get behind a winning team we can support this fall at Pikeville.
HERE'S WHAT THE COMPANY IS DOING

INSIDE THE BOOKLETS, miners saw how they voted and what the company did.

Getting Miners' Views on Safety Spurs Worker-Management Teamwork



DANNY DRIFTMOUTH mails an idea . . Learns first aid . . . . . Spreads rock dust . . .

our management, that is—read about or thought up ourselves. Mostly, our miners followed along all right, though we had to coax them sometimes. Maybe that was the trouble—we were leading them along and we weren't sharing the leadership with them.

Every year our president, Mr. Francis, has written one or two letters to all employees analyzing our safety record and comparing facts and figures both locally between our two mines and area-wise. These letters told where our safety needed most improvement and they have been very helpful, but we felt they needed more punch. Therefore it was agreed that we would not only write a letter but would also arrange our year's safety program around a questionnaire on the more important safety problems we face day by day.

Miners' Answers to These Questions Showed the Way to Better Safety

1. FIRST AID—Have you ever had first-aid training? If so, when? Would you like a first-aid training course of 15 hrs under the supervision of your safety director and the Bureau of Mines? What hours would be most convenient for you to take this training? Any comments or additional suggestions?

2. MINE RESCUE—Have you ever had mine-rescue training? If so, when? Would you like to take a mine-rescue training course of 30 hrs under the supervision of your safety director and the Bureau of Mines? What hours would be most convenient for you to take this training? Any comments or additional suggestions?

3. SAFETY REGULATIONS—Do you think that a safety regulations book published by the company would aid the men in carrying out safety regulations and help prevent accidents? Any comments or additional suggestions?

4. VENTILATION—Do you have adequate ventilation in your section? Do you have any recommendations for improving ventilation in your section or throughout the mines? Any comments or additional suggestions?

5. ROCK-DUSTING—Do you have adequate rock-dusting in your section? Do you have any recommendations for improving rock-dusting on your section or throughout the mines? Any comments or additional suggestions?

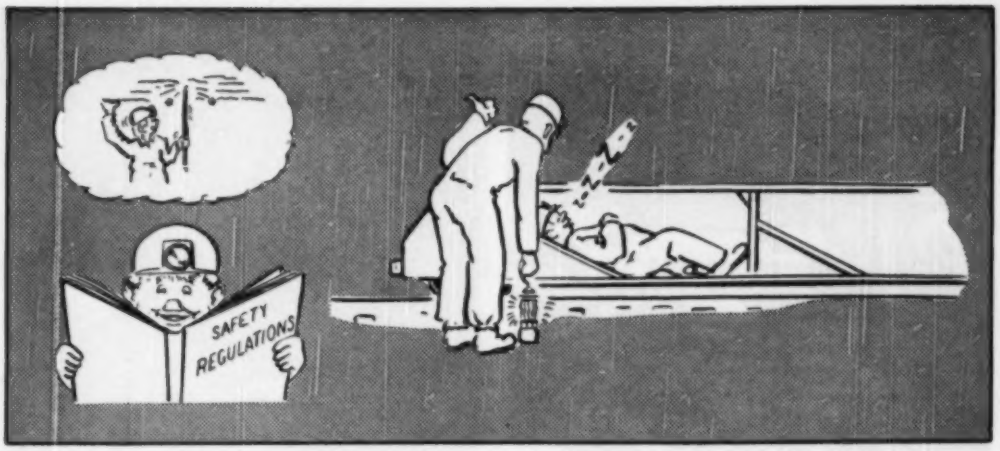
6. SMOKING—Do you have any suggestions as to how the men can be made to understand the importance of the "No Smoking" rule and how it can be more easily and better enforced? Any comments or additional suggestions?

7. MAN-TRIPS—Are you satisfied with the way man-trips are being handled with regard to safety? Any comments or additional suggestions?

8. HAULAGE—Do you have any suggestions as to how safety in hauling, mining machines and shuttle cars can be improved? Any comments or additional suggestions?

9. TIPPLES AND SHOPS—Do you have any suggestions as to how safety in the tipples and shops can be improved? Any comments or suggestions?

10. GENERAL—Do you have any comments on subjects not mentioned above which you think need attention and which can help improve the safety of your job and of the mines in general? Any additional comments or suggestions?



Studies the Safety Rules . . . . . Rides in the new man-trip car.

So Mr. Francis, Mr. William Crawford, our general manager, Mr. Irvin Spotte, our general superintendent, and I worked out a plan to find out what our miners thought about safety and what they wanted us to do about it. After all, they're the men who are closest to danger day after day and they can spot details that top management and supervisors might overlook. That's why we turned to them to help us out, with the hope that they'd give us some new ideas.

Also, we hoped that giving them a chance to speak up on safety would show them that their opinion swings a lot of weight in the front office. That, we believed, would give them a feeling of sharing leadership with us.

CA—I begin to see what you were driving at—better safety and more cooperation in safety. What questions did you ask your men?

MR. PLUMMER—Let me say right here that we wanted to keep our questions as short as possible and still cover the ground. We tried to keep them clear, too, by using short, familiar words. Also, we wanted our questions to bring out the ideas our men had and invite them to make suggestions to us.

With those things in mind, we asked our men 10 questions (Editor's note—See questions on p. 64). After each question, we asked our men for comments and additional suggestions. We think we covered the ground pretty thoroughly.

CA—How'd you circulate them among your men?

MR. PLUMMER—As I said earlier, we write an annual safety letter to all our employees and give them an analysis of all accidents that have occurred in the past year. This time, we included with our letter a safety questionnaire and a self-addressed envelope. We told the men we wanted to try something new to give us fresh ideas on how to prevent accidents and improve our record, and we asked for their help by filling out the safety questionnaire.

CA—How'd you get them back after the men had filled in their answers?

MR. PLUMMER—About 60 men returned the questionnaires by mail. These mail answers were generally very carefully thought out and answered, and on the whole we feel that this group put the most thought and study into the answers. We then asked each of our section foremen and mine foremen to take sufficient time during one or two of our operating days to get our employees to fill out questionnaires right on the job. Each foreman was provided with enough blank questionnaires and pencils and was instructed to tell each man to feel free to turn one in or not as he wished, but if he did turn one in to be sure to cite his own opinions.

The strong follow-up by our foremen actually put this program over and we received over 200 more answers. In total, about 275 men—almost half of our employees—turned in answers. We think this is an excellent response and we believe it gives a good cross-section of opinion.

CA—What did you do with the answers when they came in?

MR. PLUMMER—Well, we had to tabulate them first and then summarize them. That was a tough job. It took two persons two weeks of steady work to count and tabulate the answers, summarize the comments and organize all the suggestions. Then we had to study them.

CA—I see you went about it very carefully.

MR. PLUMMER—Yes, we tried to. But that was just the start. The men had been pretty good about sending in their answers and we thought it only fair that they should know how the answers added up. So we decided to publish them and distribute them as a report to our miners.

CA—Sounds like a good thing to do. Had you ever done anything like this before?

MR. PLUMMER—Yes. On two other occasions we had sent out pamphlets or brochures to our employees. One illustrated our scholarship program and the other was a pamphlet from the sales depart-

Reports to Miners Show How the Company Responds to Their Wishes

Three Lions, Inc.

MINE-RESCUE TRAINING was started after miners said they wanted it. Here, Safety Director Plummer gives trainees needed skills in gas detection and artificial respiration.

ment telling the miners about our sales program and the part they played in preparation and other operations. We were fortunate to have a very good local advertising firm—The Pace Wiles Advertising Agency in Huntington—which did a first-rate job for us.

At the same time that we were publishing these booklets, we were carrying through on many of the suggestions so that by the time the booklets were ready to be issued, we had completed a good part of the suggestions and could report either a completed job or the status of projects still in progress.

Pace Wiles broke the printing job down into three separate booklets of about eight pages each. They gave each booklet a different color for the cover—green, blue and red—and printed on the front cover the questions that are discussed inside. They dressed up the cover with appropriate drawings and scattered cartoons inside. Most of the cartoons show Danny Driftmouth, with Mrs. Driftmouth and the three little Driftmouths. The cartoons are keyed to the subject matter—haulage, rock-dusting, ventilation, and so on. We think these drawings make the booklets more attractive. Anyhow, our men seemed to like them.

CA—I agree with you. They help tell your story.

MR. PLUMMER—In each of these booklets we take up three or four of the 10 questions. For every question, we first give the score—"Yes," "No" and "No Answer" votes—both in numbers and percentagewise. Then we comment on the way the answers add up and quote some typical comments and suggestions handed in by our men. Finally, we tell what we had been doing before to improve safety and what we now are doing to carry out their suggestions.

CA—Mind if we take up the answers and comments question by question?

MR. PLUMMER—Good idea. You see, we're proud of the things our men said about the company and the way they cooperated with us. We think we've shown that we'll go right along with any reasonable suggestion for safety. Let's start at the beginning—this first two-page spread in the first booklet. It's about first aid.

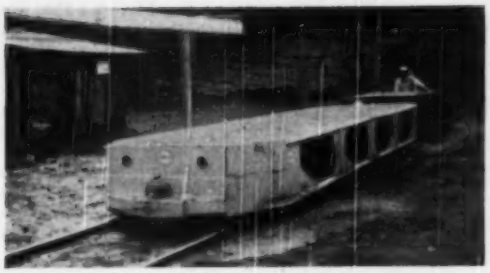
The figures there beside Danny Driftmouth, sitting in a nurse's lap, show that 208 of our men had had first-aid training and 63 hadn't. But there were 216 men who wanted to take the new course we asked about. A little over half of them said 4 to 10 pm would be the most convenient time to meet a class and a little less than half said they'd prefer 8 am to 4 pm.

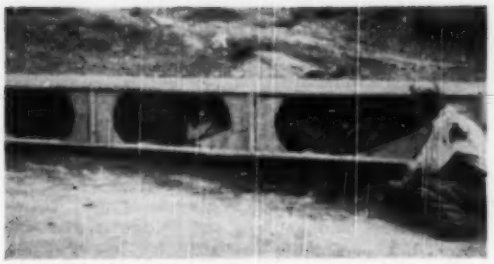
Next on the page we printed some typical comments from our miners so every man would know what some of his buddies thought. Here's one comment, for instance: "First aid is a great thing and can save the lives of many of your friends in case of bleeding or a broken back if you know how to apply this training."

CA—Those comments seem to show your men were sold on first aid.

MR. PLUMMER—We think so. In fact, we took this as a go-ahead signal. We immediately started a first-aid instructors' course under the supervision of Mr. G. E. Reid of the U. S. Bureau of Mines. Ten men completed the instructors' course. Those men immediately started teaching classes for the rest of our employees at various locations reasonably close to the men's homes. At the time this particular booklet went to the printer, we were able to say that 10 instructors had been trained and 145 men had enrolled in first aid, with 116 already having completed the course. Also, we could report that new classes were ready to start.

Unfortunately, just as these new classes got under





NEW MAN-TRIP CARS, safe and comfortable, replaced old cars after miners suggested improvements.

way, the strikes and three-day work weeks commenced and the men lost interest in these training courses. It's funny, but during strike periods when the men are idle it's hard to get them to show an interest in anything—even safety. However, from the men who completed the courses, we selected and trained an excellent first-aid team which entered the annual Safety Day Contest at Pikeville, Ky., sponsored by the Big Sandy-Elkhorn Coal Mining Institute. This team made a good showing and we think they will do even better next year after more experience.

CA—What did you find out about mine-rescue training? And what did you do after you found out what your men wanted?

MR. PLUMMER—We found out that only 31 of our men had been trained in mine-rescue work and that 117 wanted this training. Most of them preferred the hours between 8 am and 4 pm. A lot of those who wanted to take the course couldn't because of age or some disability, such as false teeth.

We now have one very well organized and active mine-rescue team which is fully equipped and practices each month. This year, we hope to expand this into two teams, one for each mine or one team from the day shift and the other from the night shift.

CA—So you're well set up if you ever have a fire or explosion. But I hope you won't ever have to use your team for that.

The third question you asked your men was whether they wanted a book of rules about safety. Did your men take to that idea?

MR. PLUMMER—Yes, we really polled a big majority for that—229 to 31. We knew it would be a long time before we could get a really first-class book of rules printed but we started the ball rolling right away and meantime told our men what we were doing and how we planned to go about it. We told them how the book would be organized, what it would contain, who would write it and who would have to approve it before we finally printed it. You'll find all that right here in our report to the men in the first booklet.

We worked a long time on our Safety Regulations Booklet and finally printed it double-spaced in rough draft. We sent a copy of this to each man and asked them all to make comments and additions or corrections. We also sent this rough draft to the state and federal mine departments and to safety officials of neighboring companies. Their response and comments were all good and with this additional material we then drafted the final write-up. The final booklet has been worked up in very attractive form and is well illustrated with sketches which should catch the miner's eye.

CA—I'm sure that's right. Did every man get a copy of the book?

MR. PLUMMER—Every man, surface and underground. It was free, too.

CA—Well, that winds up the first booklet on your questions and the men's answers. Now, what about the second booklet?

MR. PLUMMER—The second booklet reports what our men thought collectively about ventilation, rock-dusting and smoking, and what we're doing about their suggestions on those three problems.

We found that the big majority of our men were satisfied with sectional and general ventilation in our mines. We expected that, because our mines are well ventilated. But 66 men told us how they thought ventilation could be improved further. They mentioned keeping trap doors closed and in good condition, better use of brattices and portable stoppings, building overcasts and keeping outside headings up even with inside headings.

We thought these were good ideas. From now on, for instance, we'll build overcasts on every new flat entry if local conditions permit, though in some places we'll doubtless have to use doors while the overcasts are being built. We told our men about this new plan in our booklet.

CA—By the way, I notice right here, as well as elsewhere, you tell your men about some of the things you were doing even before you polled them on their ideas about safety.

MR. PLUMMER—That's right. These booklets, you see, gave us a chance to repeat some of the rules we already had for safety. Here, for instance, in this section on ventilation, we told how our company's Supervisors' Manual calls for portable wooden stoppings on Joy sections and line brattices on duckbill or conveyor sections. We also reviewed our requirements for anemometer readings, methane tests, inspection of brattices and stoppings and regular examination of air courses.

CA—That sounds good. I'm struck by one thing especially—the response you got from your men. Isn't that unusual?

MR. PLUMMER—Yes, we were pleased with it, too.

As I said, 66 men gave us some suggestions about ventilation.

And in this next section of the booklet, on rock-dusting, 51 men made suggestions. Most of the men who thought rock-dusting could be improved suggested a portable rock-duster for each section on rock-dusting on the third shift. A few thought places should be cleaned better before rock-dusting and that more rock dust should be used. We scatter 50 lb of rock dust per cut of coal and carry it to within 40 ft of the face. When a section is moved, we bring in the high-pressure rock-duster and coat all entries thoroughly.

CA—That ought to have reassured your men on rock-dusting.

MR. PLUMMER—We hope it did. But we went on in our booklet and told our men what we were doing about their suggestions on rock-dusting, explaining why split-shift rock-dusting isn't workable and how third-shift rock-dusting brings up some tough problems. However, by the time this second booklet went to the printer, we were able to tell our miners that we had started some new experiments with third-shift rock-dusting.

We promised in this booklet to continue our experiments to find a workable plan. Since then, we think we've solved our rock-dusting problem and pleased most of our men. Our laboratory reports on dust samples show much improvement.

CA—Sounds to me like good headway.

I can see how it might be fairly easy to work out something on rock-dusting because the company and management are responsible for it and it doesn't involve the personal habits of any of your men. But when you come to the next subject—smoking—you've got a problem that's highly personal. What reaction did you get from your miners about smoking?

MR. PLUMMER—Since smoking is a personal affair, as you say, we were surprised at the number of our men who thought the company could and should do more to prevent smoking in the mine. Twenty-six of them asked us to make fuller explanations of the dangers of smoking and 30 asked us to make more careful searches more often and to tighten up our discipline. One of them suggested two days' suspension for the first time a searcher finds smoking materials, five days for the second offense and discharge for the third.

With this go-ahead from our men, we made our search at Mine No. 1 more thorough and we started searching at No. 2, where we hadn't searched before. We reported this in the booklet.

CA—Did any of your men say they wanted the company to keep hands off the smoking problem?

MR. PLUMMER—No, nobody went as far as that. But some of the men offered to trade with us. They said they'd cut out smoking in the mine if we'd stop using cutting torches for inside repairs and do something to stop cable explosions. Of course, horse-trading on safety isn't the right approach. We thought the best thing we could do on this trading offer was to explain just how we do handle our cables and underground repairs.

So we made it clear in our booklet that we maintain our cables carefully and inspect them regularly, that we buy only flame-resistant cables and that we take a cable to the shop for complete repairs as soon as it has six temporary splices.

As for cutting torches, we explained what our rules are—direct supervision by a qualified man, frequent tests for gas while repairs are going on, working only in a fresh-air current and scattering ample rock dust.

We think telling our men these things brought some of them around on the smoking question. Besides, we don't believe they resent the searches as much as they used to. Lots of their buddies, you see, voted for more and better searches.

CA—Seems to me you handled that one pretty well. Now, what about the third booklet?

MR. PLUMMER—We were a little slow getting our third booklet printed because of strikes and because we were too busy writing our book of safety regulations, which we had promised our men in the first booklet. But we got the rough draft of our rule book out in August and, two months later, were ready with this third booklet in our reporting series.

This last one tells what we found out about safety on man-trips and haulage and in the tipples and shops, and it also pulls together some odds and ends.

Though 144 men were satisfied with man-trip safety, lots of them made suggestions for improvement. Their complaints included high speed, recklessness, lack of control by motor crews, too many men in a car, insufficient maintenance of man-trip cars, hauling supplies or loads on the end of man-trips and backing up the man-trip.

CA—That's a good-sized list of complaints. What did you do about them?

MR. PLUMMER—Here in the booklet, we told our miners that we had built a fire under our foremen to re-emphasize portal-to-portal safety and that we had drawn up a new set of man-trip rules and published them in our new rule book. Then we reviewed the rules we had published in our rule book—the man-trip must be kept under control at all times, hauling loaded cars with the man-trip is forbidden, foremen must call personally for the "road," the motorman must take orders from the foreman, and the dispatcher or mine foreman must clear the road for all man-trips.

CA—Does this drawing of a new-type man-trip car I see here have anything to do with what you learned from your men?

MR. PLUMMER—Yes, it does. In answer to complaints about discomfort on the man-trip, we purchased from the Irwin Mine Car Co. some man-cars suited to our own needs. These new cars, which we described in our booklet, have been in use now for several months and are proving entirely satisfactory to us and our men. The cars are of all-steel tubular construction, only 28 in high, and have an insulated top for safety and eight spring wheels and cushioned seats for comfort. The men practically lie down to travel in them. Each car carries 16 men.

But while we were waiting for our new man-trip cars, we tightened up our inspections of older cars for bad couplings, flat wheels and other faults. Now we're carrying on this maintenance schedule with our new cars.

CA—That seems to take good care of the men going into the mine and coming out. What did you do about haulage?

MR. PLUMMER—Some of the men who made suggestions about haulage asked us to keep shuttle-car drivers from driving backwards. Others asked for better maintenance, more careful cleaning of track and switches and a ban on riding machine cutterbars. Here are the things we did—and we reported them in our booklet:

1. We warned our foremen to enforce strictly our long-standing rule against driving shuttle cars backwards and asked our men to cooperate with them.

2. We reminded our foremen to set a good example in safety and asked motormen, shuttle-car and machine men to follow instructions and avoid safety violations.

3. We explained our equipment-maintenance schedule, told about new mine cars on order and explained the delay in shipment of new trip lamps, which had been ordered some time before.

4. We told how our track cleaners work on all shifts, how we are replacing 40-lb rail on steel ties with 60-lb rail on treated timber, how we are regrading main lines and how we are putting in permanent timber in all haulways.

CA—Well, that just about winds up underground safety. It sounds to me like a pretty complete job. Here in these last pages you come to surface safety. What did you find out about safety in the tipples and shops?

MR. PLUMMER—We found out that our surface workers are just as much interested in safety as our miners and have ideas that are just about as good. They asked for better housekeeping, better equipment guards, better lighting, convenient stairs with handrails, better tipple floors, frame grounding for tipple shakers and wider use of goggles for welding, grinding, cutting and burning.

We were able to tell our men in this last booklet that, in answer to their requests, we had completely re-wired No. 2 tipple, put all power wires in conduit and installed a complete new lighting system. Also, we frame-grounded all shakers permanently, replaced missing and defective guards on machines, set up a new housekeeping system and made safety goggles available to every man who needs them.

CA—That was a big job and it must have done a lot for morale among your surface men. What about the odds and ends you mentioned a few minutes ago?

MR. PLUMMER—We got a few suggestions that didn't fit exactly into any of the other classifications. We're glad they came in, because they show our men think for themselves and feel free to tell us what they think. For instance, the lamphouse man thought he could work better if his office were warmer. So we gave him a heater. Some men wanted more safety meetings. So we arranged for safety meetings to be held each week by every foreman for his own group. The notes foremen take at these meetings are turned over to me at the monthly safety meetings for foremen. In line with other suggestions, we're thinking about starting up a series of safety meetings for all our men, company-wide. We reported all this in our booklet.

That just about winds up the story of how we found out what our miners thought about safety and what we did after we found out. Any other questions?

CA—Yes, two or three more. First, do you think the program was worth the effort?

MR. PLUMMER—Yes, we think so. Here's why:

First, we got some good ideas about how to make our mines safer.

Second, we think our men were glad of a chance to tell us what they thought about the way we operate our properties and that, by answering our questions, they learned a good deal about their own stake in safety.

Third, it gave us a chance to show our men that we want to work with them for better safety and that we'll do everything reasonable and workable to cut down the accident rate.

Fourth, we know that a great many of the miners' wives read these booklets, since they are mailed to their homes. In this way, we believe we have helped make the entire family more safety conscious.

Those things, we think, are on the credit side.

CA—No room for argument there. Do you plan to carry on this program or one something like it?

MR. PLUMMER—Yes, we'll probably try something like this again in the future. That's because of the answers we got to a few more questions we asked at the very end of our last booklet. Here are the questions:

"Have you enjoyed reading these brochures?"

"Do you think they have helped make the men more safety conscious?"

"Have they explained clearly what your management is trying to do?"

"Would you want a similar questionnaire next year?"

"Do you have any other suggestions?"

We gave the men a postcard and asked them to use it to answer these questions about our program. We got some good answers. On the whole, the men liked our booklets and thought they really accomplished something toward making our men safety conscious. Here are a few typical replies from our men:

"I have enjoyed reading the little pamphlet and I believe it will help us all to work more safely."

"The questionnaire has given the employees a part in making the safety rules. I believe the employees will regard them more than if they had not had this opportunity in helping make the safety rules."

"I think you have gathered together a fine bunch of safety rules. Now let's all work together and put them to practice."

"I have enjoyed reading the brochures very much and I believe they have made the men more safety conscious. They explain very clearly what the management is trying to do."

"Yes, I would like to get the same next year."

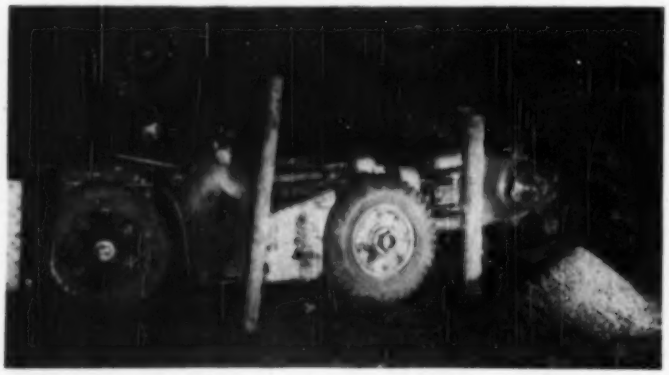
"Enjoyed reading them. They have clearly explained what you're trying to do and they should make everyone feel agreeable to them and more safety conscious. A similar questionnaire next year would be fine."

Those are just a few of the postcard replies we received. The rest were along the same lines. We think we got the kind of response we hoped for.

FIRST OF THE TRACKLESS LOADERS at Regent, which went into regular production April 21, 1949. Five machines ultimately will handle all the mine production, presently averaging about 3,400 tons of raw coal per shift.

How Regent Mine Gets Results

"TO ME, THERE'S NO COMPARISON between track and trackless mining. I think you can get about the same tonnage with both kinds of machines under the same conditions, though we're averaging more from the trackless units with smaller crews. But even if the tonnages were the same, trackless is cheaper. There's no extra labor for delivering track materials, laying them and taking them up when the section is worked out. And recovery is greater because there's no coal left in the track or back of the timbers. When a section is finished, pillars can be recovered to the extent that natural conditions will permit without deadwork or possibility of losing track under falls of roof."—Joseph E. Bose, superintendent, Regent and Jonay mines, Linton-Summit Coal Co.

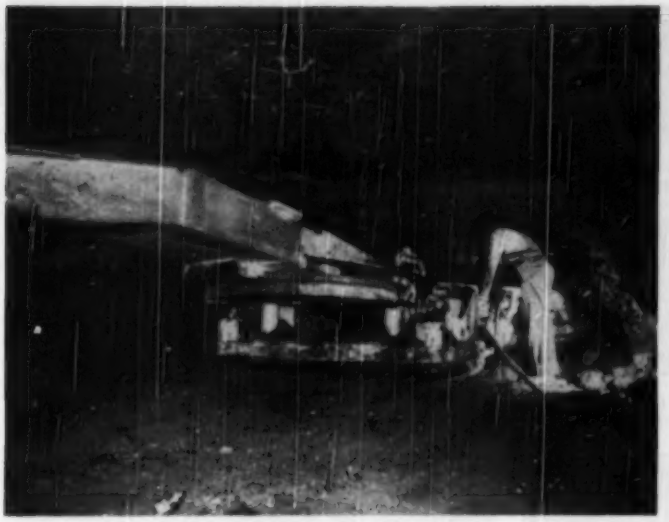


CENTER SHEARING with rubber-tired cutting equipment reduced the load on drillers, balanced the preparation cycle and eliminated bugdusting.

TRACKLESS MINING with new-type crawler loaders and shuttle cars got under way at Regent mine of the Linton-Summit Coal Co., Sullivan, Ind., early in 1949. At the end of March, 1950, three such units, plus 3½ track units, including one operated by half a crew in miscellaneous work, were accounting for approximately 3,400 tons of raw coal per shift, with a working height of 5½ ft. Two additional trackless units are scheduled for future installation, at which time production will be almost completely from such equipment. With four to five fewer men per crew, the trackless units are averaging around 70 tons more per shift than the track outfits.

• **Belt Slope Serves Mine**—Development of Regent mine started Nov. 1, 1945. It is a belt-slope operation, and the belt went into operation June 12, 1946. The seam is the No. 6, under 80 to 150 ft of cover, with the average approximately 130 ft. Seam thickness ranges from 4 ft 11 in to 7 ft. The average is about 6 ft, of which 6 in—rashy in nature and high in sulphur—is left in the bottom, making the average working height about 5½ ft.

One parting about 1 in thick oc-



NORMALLY AVERAGING 600 TONS or more per shift, this latest Regent trackless loader turned out nearly 700 tons March 22, 1950.

In Trackless Mining

curs about a foot above the bottom and the undercut is made immediately under it, thus automatically leaving about 6 in on the bottom. Two other 1-in partings about 6 in apart occur near the center of the seam.

The bottom is fireclay. The top is a light-gray slate varying from 1 to 8 ft thick. It ranges from strong to tender, with the tenderest normally found where the coal is thickest. Above the slate is a sand-shale stratum with relatively little strength. As the slate top thins down, the sand-shale generally becomes weaker and more fragile. Heavy crossbarring is necessary along the main entries, and to some extent in the secondary and panel openings.

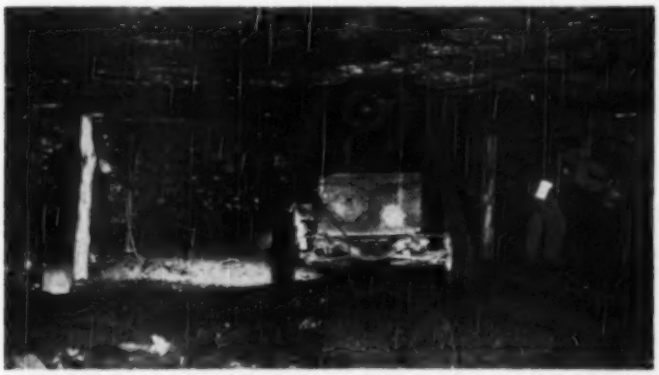
• Early Production Equipment—The initial production equipment at Regent consisted of Goodman 360 BH hydraulic track loaders with Jeffrey 56-A drills, 7-ton Sanford-Day and ACF drop-bottom cars and Bethlehem prefabricated track in the working sections. This combination resulted in unit outputs averaging between 450 to 500 tons per shift.

It was felt, however, that trackless mining offered the possibility of higher unit tonnages with fewer men, in addition to savings in supply, tracklaying and recovery labor. With the development of the Goodman 660 tractor-tread loader and shuttle-car equipment, a unit was installed for test and went into regular production April 21, 1949.

• Organization for Trackless Mining—The latest trackless unit comprises the following equipment: Goodman 660 BH hydraulically operated tractor-tread loading machine, two Goodman Types 570 and 571 shuttle cars (right- and left-hand drives) with elevating discharges, a Joy 10-RU rubber-tired cutter with 9-ft bar (forged and quenched bits) and two Dooley 473 post drills with Hardsocg augers and heads. The drills are transported and serviced from a truck made from an old Model A chassis.

Capacity of the late-type shuttle cars, under Regent loading, is 4.8 tons. Height of the cars is 48 in. The cars are paired in right and left drives to put the cables on opposite sides of the headings in pulling to the car-loading stations, or ramps. The older cars, which will be exchanged, are without elevating discharges and have a capacity of 4 tons under Regent loading. Temporarily, even the cars with elevating discharges are run up on ramps to transfer the coal to the mine cars. The track is dropped by lifting bottom to facilitate loading. In the future, such ramps will be eliminated as fast as possible, and the top will be shot to facilitate transfer directly over the sides of the mine cars from either side of the track.

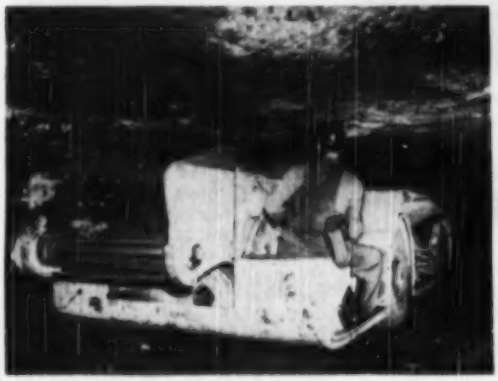
• Efficiency Achieved in Haulage—Mine-car loading averages 6.92 tons. The total of 100 cars is made up of 50 Sanford-Day and 50 ACF. All are equipped with Ohio Brass automatic couplers, which have increased haulage safety and materially assisted in cutting trip-changing time at loading ramps to 15 to 20 sec. A second factor in reducing changing time is tracking of the two inside headings on panel entries and the establish-



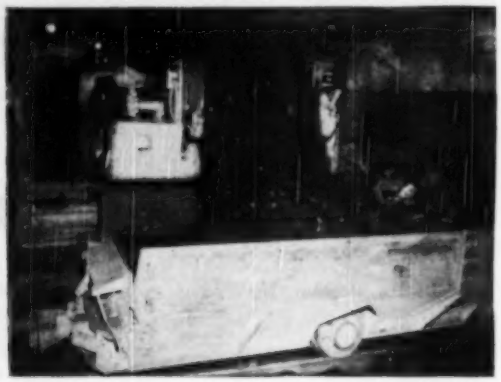
TWO POST DRILLS put four air-breaking holes into each half of a 24-ft center-sheared place from single set-ups on each rib.

Air Breaking and Automatic Couplers Play Part in Regent Efficiency

CUTS ARE BROKEN BY AIR, using 3-in tubes (left). Up to 188 holes per shift have been drilled and broken by two drillers and a shooter. At the right, Alva Engle, mine foreman, and H. Johnson, section foreman, look over a fall before loading.



LATE-TYPE-CABLE-REEL SHUTTLE CARS holding 4.8 tons and equipped with elevating discharges pull coal from trackless units.



AUTOMATIC COUPLERS on 6.92-ton drop-bottom cars facilitate changing trips at shuttle-car ramps in 15 to 20 sec.

ment of crossovers immediately outby each ramp location.

With one exception, where a hill makes it necessary to use a relay unit, cars are handled to and from the working sections in trips of seven by the main-line locomotives, each operating without a trip-rider. In the trackless sections, this means that the empties are delivered to a crossover immediately outby the loading ramp.

• **Trips Changed Quickly**—From the crossover delivery point, the ramp locomotive (General Electric or Jeffrey cable-reel unit), picks up 3 or 4 cars and pulls through the crossover past the ramp on a tail track, as shown in the accompanying panel plan. It then drops the cars back one by one until the trip is filled. The trip then is trammed straight out until it clears the crossover and is left on this loaded track while the locomotive picks up a new trip through the crossover. This process is completed in 15 to 20 sec with the help of automatic coupling.

With the trip-handling set-up at Regent, plus the advantages gained by car and coupler design, it has been possible to serve units as far as 6,000 ft away from the shaft with 14 cars made up in two trips of seven each and still permit the loaders to produce as high as 600 to 650 tons per shift.

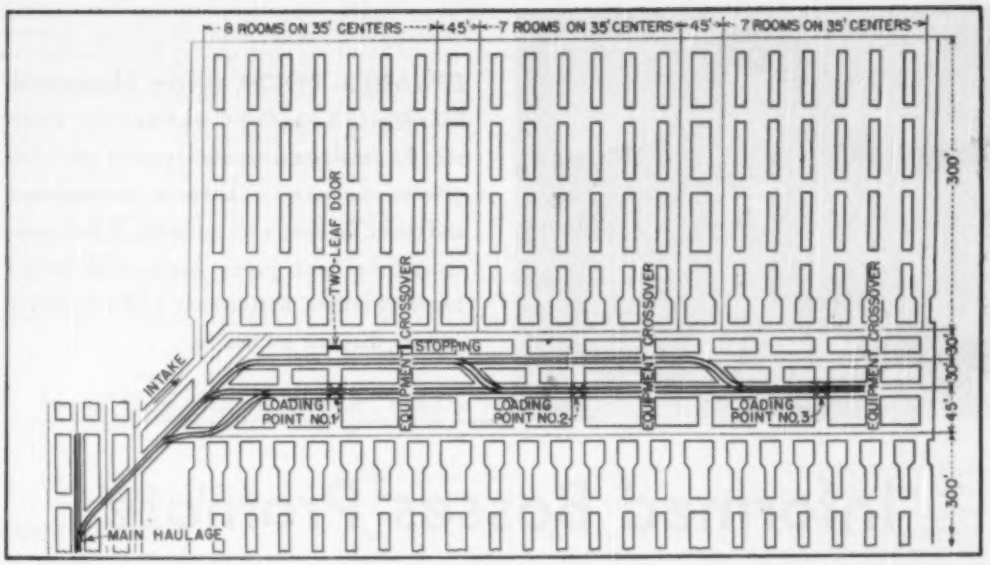
• **Crew Size Reduced in Trackless Mining**—Excluding supervision and main-line-haulage labor, trackless units normally are operated by crews of 13 men. Crew make-up, with the make-up of a track unit for comparison, is:

	Track	Trackless
Operators	1	1
Helpers	1	0
Cutters	2	2
Drillers	3	2
Bugdusters	1	0
Shooters	1	1
Electricians	1	1
Trackmen	1	0
Timbermen	2*	2*
Motormen	1	1
Trip-riders	1	1
Buggymen	0	2
Total	18	13

*Minimum; as many as four may be employed if bad top conditions occur.

With this crew set-up, the latest of the trackless units has consistently produced 80 cars or more, with the exceptions normally to be expected, and on March 22, 1950, reached an output of 100 cars, or nearly 700 tons, working partly in rooms and partly in headings.

• **Trackless-Mining Plan**—Standard panels for trackless mining comprise 44 rooms, 22 on each side, as shown in the accompanying illustration. The panel opening consists of two headings 12 ft wide on 50-ft centers. Two additional headings then are added on 30-ft centers. The outside heading of



REGENT PANEL PLAN, showing track and ramp locations. Rooms on one side are mined advancing; on the other side, on retreat.

the two on 50-ft centers is the main return, while the ramps always are placed in the heading on the opposite side of the thick chain pillars. This arrangement, among other things, permits installation of two-leaf doors on the intake side of the ramp far enough away so that a shuttle car will clear them and thus permit them to close when it is discharging to mine cars from that side. Therefore, there is no interruption in ventilation during the car-loading period when operating from the stopping side of the panel.

Rooms are driven 24 ft wide on 35-ft centers 300 ft deep. With 22 on a side, three ramps are provided for working out a panel, the first at No. 4 or 5 room and the following ones at Nos. 11 or 12 and 18 or 19. The practice is to work the rooms on one side on the advance, at the same time extending the headings and necking those on the opposite side four cuts deep. When the headings are driven up and the rooms on one side are completed, those on the other side are mined on the retreat, using the same ramps.

• **Ramp Set-Up Cuts Shuttle-Car Haul**—While driving ahead to establish the next ramp and make room for 100 ft or so of tail track, the four headings are prepared and loaded in cycle with the rooms. When the ramp is established, the headings may be stopped temporarily or loaded only once a day instead of more frequently. Under this panel system, with the ramps in the approximate center of each room group, the maximum shuttle-car haul never exceeds 500 ft. In fact, cable length on the shuttle cars is limited to 500 ft and the cables are anchored at the ramps.

• **Attaining Continuous Cycle**—A continuous cycle is necessary because a normal day's output requires loading out 24 cuts or more, while the number of places available may not exceed 12 or 15. Cutting and drilling are balanced by using two post-mounted drills and center shearing, which reduces the number of holes and thus enables the drillers to keep up. As a by-product, it is unnecessary to bug-dust.

Capacity of the loading unit still is in excess of the capacity of the preparation equipment, but building up cutting and drilling capacity would, study of the situation indicated, require both additional equipment and labor more than offsetting possible gains. Still, however, emphasis is placed on keeping preparation going at top capacity so that if a loader breakdown occurs there will be an opportunity, with coal ahead, to make up a part or all of the loss.

• **Coal Broken by Air**—Average depth of cut in the trackless sections at Regent is 7½ to 8 ft—about the normal to be expected with a 9-ft bar with air breaking. As previously indicated, the final step in cutting a room is shearing it in the center. The 24-ft-wide place then is broken with eight Airdox holes drilled by the two drills from two set-ups, one on each rib. Top holes are angled slightly up to almost touch the top at the back and insure peeling the coal off the roof. Bottom holes are drilled immediately under the top ones and directly over the center partings to break them down and throw down the bottom bench.

Rib holes are gripped slightly toward the rib, while the center holes are angled in toward the shear, bottoming about 2 ft from it. As noted, all four holes on a side are drilled from the same set-up—about 2 to 3 ft from the rib. A 3-in Airdox tube is used for breaking. Normal breaking pressure is 10,000 lb. As many as 188 holes have been drilled and broken by two drillers and a shooter in a shift.

Of the two timbermen in a trackless crew, one normally accompanies the loader to set and move safety posts and otherwise help out. The second sets safety posts and extends regular timbers—one row on each side of the place—ahead of the cutters, drillers, and so on. Drillers and others also move and reset safety timbers as necessary. Dust on the bottom is kept down with calcium chloride.

EDWARD A. LYNCH, director of personnel, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., analyzes ways and means of achieving greater cooperation between management and miner. To secure cooperation of their men, supervisors need policy background behind top-level orders. Bosses must earn the worker respect they are entitled to.

Informed Bosses Promote Better Employee Relations

SUPERVISION is a vitally necessary part of human society.

Because the supervisor himself is a human being who must supervise and direct other human beings, the results of such supervision follow no set pattern. Consequently, it is impossible to establish a rigid formula for the attainment of a perfect result because the human equation is present both in the effort and the result.

Good supervision is, of course, an integral part of the operation of any coal mine. Not only is the product secured at the face, but it is there that management, through its foremen, has its most direct contact with labor. However, it is impossible to begin the establishment of a program of good employee relations with facebosses. It must be begun at the top if genuine worker cooperation is to be obtained.

How Top Management Can Win Worker Confidence

1. Good Relations Begin at the Top

Good employee relations in any company flow from top management down to the working face. It is futile for a company to expect its facebosses to earn the respect of the men they daily supervise until that company management has first earned the respect of those facebosses by the manner in which it treats them and the way which company management cooperates at and between its various levels.

No supervisor can set out to win the confidence and respect of the men under him if he feels he is not being treated fairly by his immediate supervisor, the men above him, or by top management itself. And that goes for the faceboss, the section foreman, the mine foreman or even the division superintendent.

Any program of employee relations, then, must start with the president of the company. What are the relations in top management? What about the relationships among the other levels of management horizontally? Are the relationships good in the vertical sense? Are company policies governing the pay and working conditions of all levels of management fair and just?

2. Facts About Company Policy Help Supervisors

A very important function of top management in maintaining its relations with the men on the lower supervisory levels is keeping them well informed on company activity and company policy. Too often this point is neglected and this neglect becomes especially bothersome when a necessary change in policy is to be made. Ofttimes, orders changing company policy are handed down through channels, and the supervisory men in direct contact with the working force have no knowledge of the matter except the direct language of the order itself. The task of the men who must carry out the order, as well as its reception

by those affected, would be much easier if those in the higher levels of management would take time to give their supervisory men all the facts and circumstances. Briefing of supervisory men on changes of policy or methods of operation, introduction of new methods, and other matters of this character always pays good dividends. Go through channels—yes—but send the facts through channels as well as the orders.

Supervisory men must not only be made to feel that they are receiving fair treatment but, what is equally important, that they are receiving support from the higher levels of management. If there is room in any company for fairer treatment or greater support of supervisors, then that company's job in that direction will not be finished until those objectives have been attained.

Have a foreman ask one of his miners what he thinks of the company and you are likely to get an answer that will surprise you. When you try to go deeper, you probably will get a story that goes back to his father or his grandfather, back to something the company did against them. And if the company wants to be frank, in most instances it will have to admit the man's attitude is probably justified, for the coal industry, as a whole, has been extremely lax in the matter of sound relations. It has been accumulating bad employee relations for several generations.

These are some of the trials and tribulations supervisors in the industry have to contend with today. These will diminish as the management-status of the industry's supervisors increases.

How Supervisors Can Help Themselves and the Company

1. The Supervisor's Opportunity And Responsibility

To get down to cases and direct our remarks to the supervisors themselves, it should be pointed out that the supervisory men in any coal company are the men charged with the day-to-day responsibilities of administering the policies of that company.

Most people where the company operates do not know the president or the treasurer. They're just names. But in your family, among friends and associates, and in your church or club groups, your company, its accomplishments and its policies, boil down to just one person—you, Mr. Supervisor. To them, you are Mr. Coal Company.

Your company's public relations is not something you can hire someone else to worry about. It is right smack in your lap. Your company's standing in the community, your own position among your friends and family, your job, and the jobs of your fellow-workers, all depend on whether you practice good public relations in your own self-interest.

The mineworkers who work for your company constitute a much larger group than yours, but they are a group that likewise has a responsibility for contributing to the general good of your company. The willingness with which they contribute to the general welfare depends, in a large measure, on the effectiveness of your public relations with them because you have direct daily contact with them.

2. Friendly Approach Improves Relations

In approaching your task, please remember you are not handling slaves or automatons. Your men are human like you. Ground your relations in this creed: "I sincerely believe in the dignity of man." Never lose sight of human considerations. You'll find it really pays.

Try to establish your relations on a friendly basis. Get to know your men by their first names. Learn something of their families. If there is sickness, inquire solicitously about progress. When congratulations are in order, offer them.

If you have an order to give, do not "issue an order." Rather instruct your men on what you want done. Don't let them get the impression that you are trying to show your authority. Do let them know that you are requesting that a certain thing be done because it is necessary for proper and safe operation. Use language that explains the matter in terms of benefit to the men.

If you must criticize a man for a misdeed, don't "bawl him out." Rather tell him or show him how he might have done the job better. Above all, never fail to give a pat on the back for a job well done.

3. Effective Supervision Helps Workers, Earns Respect

Your daily instructions to your men are designed to help them. Now that may sound funny to some of them, but here's how it's true: all supervision is directed toward the goal of operating a mine as safely, efficiently and economically as possible. A mine so operated is bound to have a long economic life provided, of course, it has sufficient reserves and no adverse conditions are encountered. All things being equal, a well supervised mine is a good place to work because the future work opportunity is greater.

The necessity for supervision is evident. You have it in your home. If you are head of a family you exercise, in cooperation with your wife, close supervision over your children in any and all events that take place in your home. We have supervision in our towns and cities, our counties, states and Nation.

Supervisors, in all strata of society, are entitled to proper respect from the supervised, as well as compliance with legitimate rules and regulations. However, that respect must be earned, and you'll learn that human kindness is a low price to pay for it.

TO IMPROVE STEAM-COAL QUALITY, the air-cleaning plant at the right was added to the Bunker tipple. Raw slack from a stockpile is being dumped to a hopper feeding onto the new belt conveyor in the enlarged slope.

Air Cleaning Rounds Out Trotter Modernization

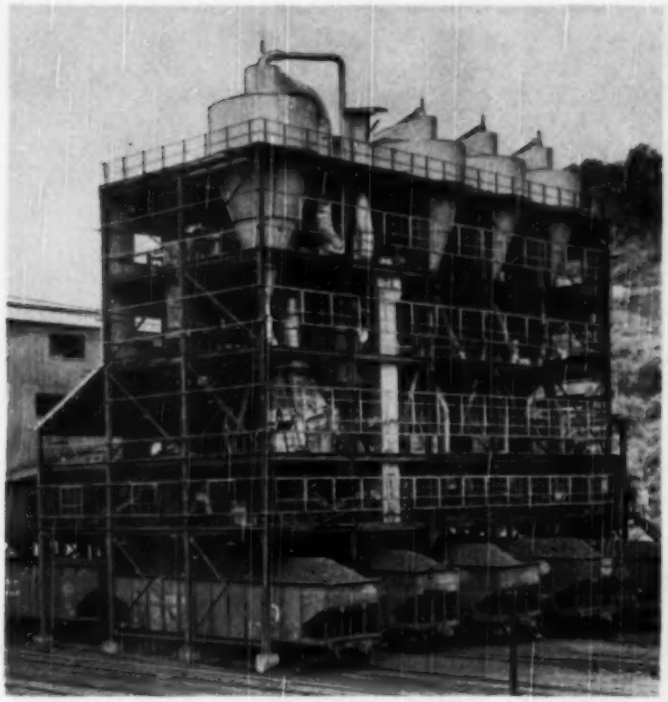
Improved Steam-Coal Position and Increased Mine Capacity Follow Modernization at Trotter Coal—Both Mines Equipped With Air Plants — Belt Slope and Haulway Reconstruction Lead Bunker Mine Improvements

RECENT COMPLETION of a 250-tph air-cleaning plant—the first air plant in the northern West Virginia field—brought close to conclusion an improvement program at the Bunker mine of Trotter Coal Co., Cassville, Monongalia County, W. Va. Completion of the plant materially improved the mine's position in the steam-coal market and raised shift capacity from 1,700 to 2,600 tons. A smaller air plant also was installed at the company's Louise mine, likewise on Scotts Run. Bunker mine normally operates two shifts and produces 4,000 tons of cleaned coal per day.

Both mines are in the Sewickley seam and the coal is loaded with Joy machines. The 5½-ft seam is clean except for two thin bands of sulfur, one at the top and the other about 2 ft from the bottom. Hand picking is satisfactory for cleaning the larger sizes. The particular and pressing problem was to reduce ash in the minus-1¼ steam coal. After careful consideration of the many factors involved in wet and dry cleaning, the latter was selected.

• **Four Boxes Clean Stoker and Slack**—The new plant, added to the existing tipple and designed and built by Interstate Engineers & Constructors, Inc., includes four Roberts & Schaefer Super-Airflow cleaners. One, rated at 100 tph and termed the stoker box, cleans ⅜x 1¼, and the other three, rated at 50 tph and termed slack boxes, clean ⅜x0.

Screening equipment, conveyors, fly gates and valves are arranged so that several variations can be effected in the feed. For instance, the minus 14-mesh can be diverted



BUNKER AIR-CLEANING PLANT before the protected-steel siding was installed. Capacity of the new plant is 250 tph, minus 1¼ coal.

from the slack-box feed to the refuse. Also, the cleaned-coal handling arrangement permits fixing in any desired combination with the run-of-mine or the 2x0.

• **Steel Houses New Plant**—The new plant is housed in a 60x90-ft steel structure spanning five loading tracks. The flat roof is 68 ft above the railroad tracks and the cyclone dust collectors project 14 ft above the roof. Built-up roofing is used and "Plasteel" protected metal covers the sides.

In addition to the four cleaning units, the new plant contains 7 belt conveyors, 6 vibrating screens, 7 scraper conveyors, 1 drag-chain conveyor, 2 bucket elevators and 12 fans. Counting the three small motors of each cleaning box, the new machinery is driven by 47 motors up to 40 hp in size. Total connected load is 465 hp.

In the existing tipple, lump from the main shaker is crushed to 5 in. The older plant includes a Robins "Gyrex" and a Tyler "Niagara" vibrator, both used in preliminary sizing. Surge bins of 50 tons each feed the slack boxes and a 40-ton surge bin feeds to the stoker box.

• **Vibrators Handle Screening**—All six of the new vibrating screens serving the new plant are 4x10 ft in size. Five are Allis-Chalmers Aero-Vibe units operating in the raw-feed and slack-cleaning circuits. One Robins Gyrex handling cleaned coal from the stoker box removes degradation and makes two sizes: 1¼x¾ and ¾x⅜.

Blowers handling pressure, exhaust and recirculation for the boxes were furnished by the New York Blower Co. All pressure blowers are Type 270 units with 27-in-diameter wheels. Motors on the slack blowers are 30 hp; stoker, 40-hp. Exhausters for the three slack tables are Type 330 units with 33-in-diameter wheels and 30-hp motors. The stoker exhauster is a Type 365 unit with 36½-in-diameter wheel and 40-hp motor. All four recirculating blowers are Type 17 units with 5-hp motors.

Westinghouse 220-v "Life-Line" motors drive most of the conveyors. Allis-Chalmers screens are driven by Allis-Chalmers motors. Blower motors are Reliance. Westinghouse De-ion linestarters are employed. Construction of the central control panel, using Westinghouse switches and indicating lamps, was handled by the West Virginia Electric Corp., which also did the wiring.

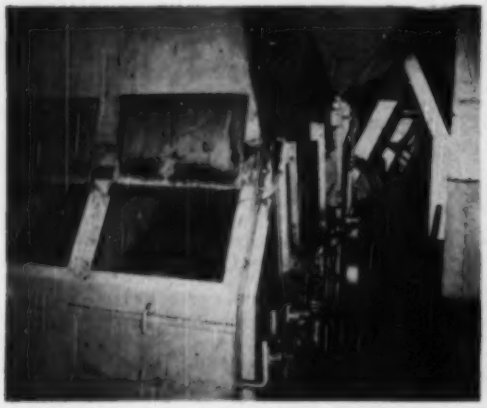
• **Bunker Modernization Program**—Modernization of Bunker mine started some years ago with the installation of complete mechanical equipment underground. This was followed by the purchase of Differential eight-wheeled mine cars and a Differential single-car rotary dump. However, hoisting the cars one at a time up the slope to this dump, installed in the tipple, continued to be a bottleneck, limiting production to 1,700 tons per shift.

To eliminate this bottleneck and reduce the mine-bottom and dumping expense, installation of a belt conveyor in the slope was clearly indicated. There were, however, two difficulties: (1) the slope was not wide enough to accommodate the belt and the track, which had to be kept for handling supplies; (2) the mine could ill-afford to shut down while enlarging the slope and excavating for a hopper under a rotary dump on the mine bottom.

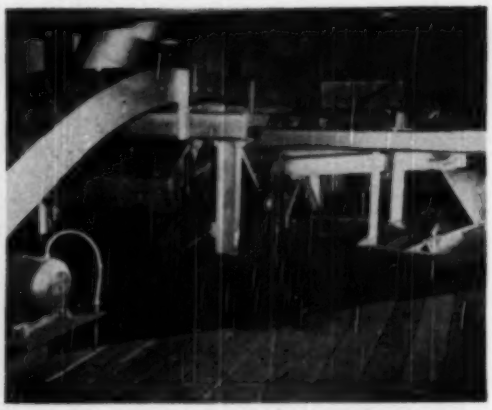
• **Belt Installed Without Shutdown**—In spite of the difficulties it was decided to install the belt and carry out all excavation and installation without shutting down, even though it meant a much longer construction period. Slope enlargement and bottom excavation were successfully accomplished without interfering with two-shift production, and a new Differential rotary dump; reciprocating feeder; 48-in by 60-ft (c.c.) feed-belt conveyor; and 42-in by 450 ft (c-c) slope conveyor were put into service Oct. 4, 1948.

The increased capacity rating of 325 tph has been fully realized in the actual handling of 2,600 tons in 8 hr. In the dumping and handling of the coal from the mine cars to the tipple screens, fewer men are required as compared to the old method.

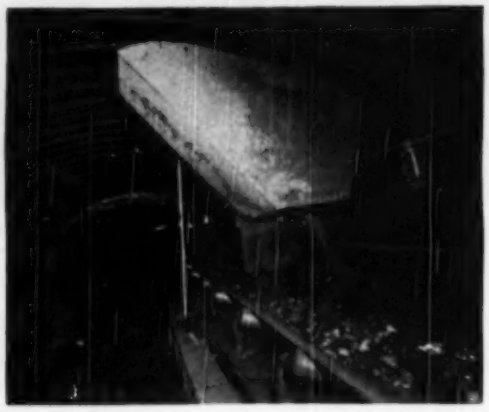
In excavating for the 130-ton underground dump hopper, feeder and cross belt, a considerable saving was effected by making the excavation the shape of the hopper and forming the sides of concrete rather than excavating a rectangular pit and using steel to support the hopper. By using the 60-ft cross conveyor, which delivers at 90 deg to the slope belt, it was possible to construct a separate bottom for the new dump. That permitted hoisting



BUNKER CLEANING UNITS—stoker table in the foreground and the three slack tables in the background. The stoker unit cleans 1¼x⅜, while the slack units prepare minus ⅜.



SLACK IS DISTRIBUTED to surge bins ahead of the tables by a three-compartment drag conveyor. Two vibrating screens are between the conveyor runs. A third is at the right.



NEW SLOPE BELT, 42-in by 450 ft, replaced car hoisting, saved five men and stepped shift capacity from 1,700 up to 2,600 tons. A view down the enlarged slope appears at the right, showing the truck hopper with the gate open and feeding onto the belt.

of cars to continue. And, since the old rotary dump was left in place in the tipple after the belt was put into service, hoisting can be resumed on short notice in case of breakdown of any of the new equipment (*Coal Age*, January, 1950).

• **Spray Chamber Settles Dust**—Instead of water sprays in the rotary dump to control dust which, unless very carefully controlled, would interfere with fine-coal screening and operation of the boxes, the dust is sucked from around the dump and then settled by sprays in an adjacent underground chamber. The rotary dump is housed to confine the dust. The blower which pulls air through it is a Ladel unit built for ship use.

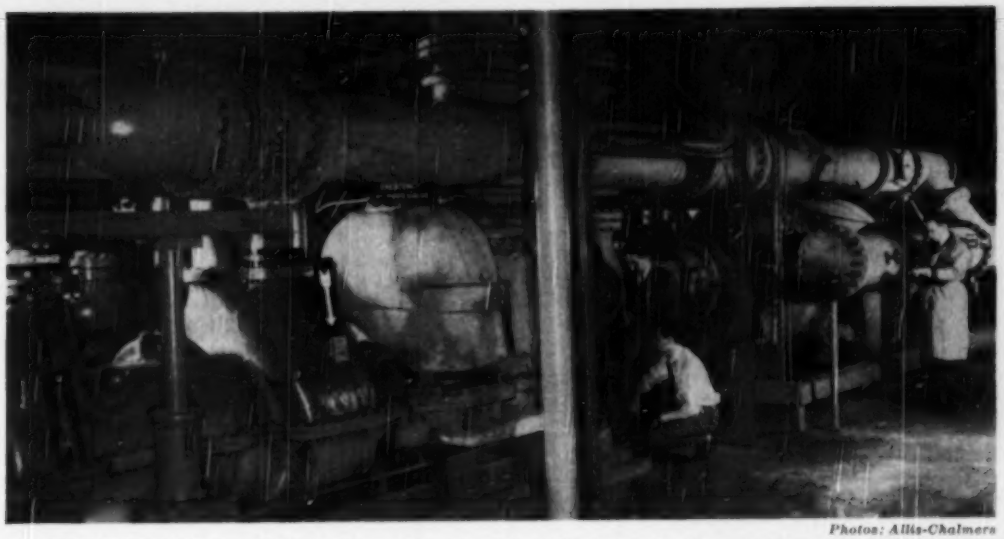
Provision for handling truck coal to the tipple was included in the slope improvement. Near the portal, a hole was cut in the top of the Armco corrugated steel lining and fitted with a hopper and gate to receive coal dumped from a truck and feed it onto the slope belt. Receiving coal from truck mines was not the objective. Rather, the aim was to reclaim and air-clean slack stocked from the Bunker output during the months prior to getting the air plant into operation.

The remaining improvement still in process is modernization of a 2-mi underground haulway (*Coal Age*, January, 1950). The 65- and 25-lb rail of the old track are being replaced with 85-lb laid on 5x7-in by 6-ft creosoted ties ballasted with 6 in of crushed limestone.

• **Louise Mine Also Served by Air Plant**—Louise mine, where the smaller cleaning plant was installed, produces 1,000 tons per day. One Roberts & Schaefer Super-Airflow unit rated at 50 tph was installed to clean ⅜x0 slack. Preparation of the feed required adding an Allis-Chalmers 4x10-ft Aero-Vibe screen to the existing tipple. The cyclone dust collector and fans are identical with those for the slack-cleaning units at Bunker.

James T. Trotter is president of the Trotter Coal Co. E. W. St. Clair is general superintendent, and L. H. Connor is assistant superintendent. Howard K. McKelrath is general mine foreman at Bunker and C. D. Campbell is master mechanic. John L. McGovern is general mine foreman at Louise and R. B. Peddicord is master mechanic.

Locomotive Development Work Brings Nearer . . .



Photos: Allis-Chalmers

HOUDRY-TURBINE PLANT is next-to-final stationary test unit. Tests of the first new-type locomotive power plant will begin soon.

The Coal-Fired Gas Turbine

Progress Toward New Locomotive Shows How . . .

Big Problems Have Been Solved
The New Power Plant Works
Railroads Will Benefit
The Coal Industry Will Gain

CAN A HIGH-EFFICIENCY gas turbine be built to burn coal? Members of the Locomotive Development Committee, Bituminous Coal Research, Inc., believe it can. They believe so because they saw a locomotive-size gas turbine running on pulverized coal last December. Though that run was a test-stand demonstration, it reproduced locomotive-operating conditions in all important particulars. It proved that the LDC has found the answers to its biggest problems—coal handling, combustion and flyash removal.

Manned by the chief executive officers of nine coal-carrying railroads and four big coal companies, plus an able staff of mechanical and combustion engineers, the LDC has worked at this project for over 5 yr. In that time, it has solved some sticky problems and run up some blind alleys. But the work has gone ahead and now, after a long period of researching, testing and cutting and trying, the gains add up to real achievement. From here on, the outlook is good.

The special merits marking the coal-burning gas turbine, as compared with other types of power plant, are: low operating cost, simplicity, compact structure, minimum maintenance and, ultimately, low investment cost. It has only four major components—compressor, combustor, ash collector, and turbine. It operates without smoke and needs no water. These are among the reasons why the LDC has brought the studies thus far and intends to carry them through.

Where will the turbine be used first? How did the LDC solve the big problems? How does the plant work? What are the problems ahead? And how will the turbine affect coal's markets in competition with the diesel?

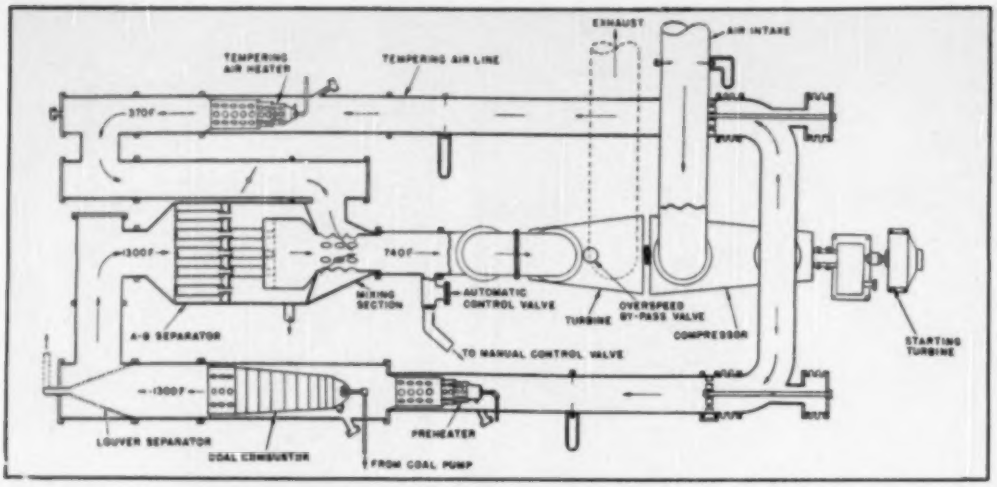
Based on a paper delivered before the Midwest Power Conference, Chicago, April 7, 1950, by John I. Yellott, LDC director of research.

Who Needs the Coal-Fired Gas Turbine

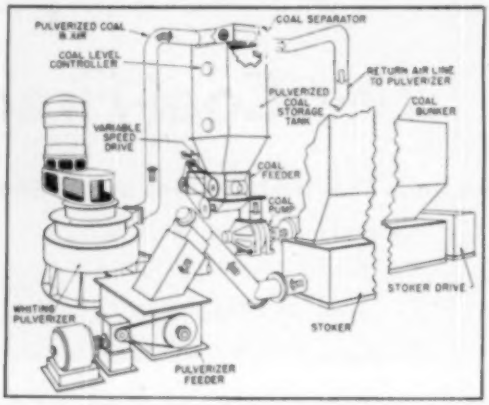
THE MOST PRESSING NEED for a coal-burning gas-turbine power plant is in railroading. There, though coal still is the cheapest fuel in terms of cost per million Btu, it is no longer cheap enough to offset the merits of the diesel-electric locomotive, which runs at high thermal efficiency—close to 25%—as against some 5% for the conventional reciprocating steam locomotive.

Price changes haven't helped coal in the railroad market. Take, for instance, recent reports on fuel costs of three major eastern roads to the Interstate Commerce Commission. At the end of 1949, railroad diesel fuel sold for about 69c per million Btu, an increase of 28% since January, 1945. Heavy fuel oil, though it moved down and up on about the same pattern as diesel fuel in the intervening years,

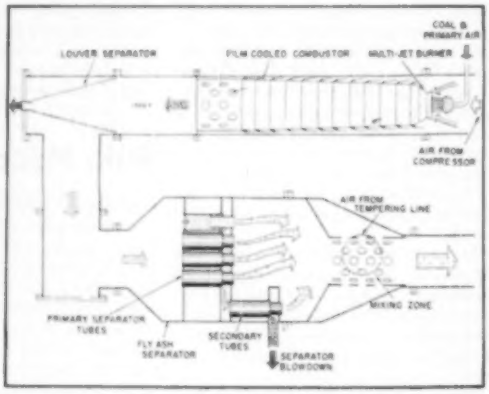
Test-Installation Operation Proves Gas-Turbine Possibilities



COAL IS BURNED on one side of locomotive-size test plant, oil on the other. Real locomotive will burn coal on both sides.



COAL-HANDLING SYSTEM delivers powdered coal to storage tank. Specially-built pump, supplied from drum feeder, pressurizes powdered coal and feeds it in air stream to stainless-steel combustor.



COMBUSTION AND FLYASH REMOVAL systems deliver clean air too hot to use on Houdry turbine blades. It is cooled in mixing zone by air from oil side. Real locomotive turbine will use air at full temperature—1,300 F.

stood in December, 1949, about where it stood in January, 1945—45c per million Btu. The cost of bituminous coal, however, moved in a steady upward climb from about 12c to over 18c per million Btu—an increase of about 50%.

Meanwhile, the diesel moved out in front. In addition to high thermal efficiency, the changing fuel-price pattern and glamor treatment in railroad advertising, it gained through design and maintenance improvements unmatched by steam.

But when the coal-burning gas-turbine locomotive is put on the rails, coal will begin to regain its strength in the railroad market. LDC experts predict that fuel costs per hour for 4,500-hp diesel and coal-turbine locomotives will be something like these:

	Diesel	Coal Turbine
Idling	$ 1.25	$ 1.75
Half load	13.00	6.00
Full power	25.50	10.25

Thus, in road service where the average load is 60 to 75% of full power, the new coal-burning turbine will save $10 to $12 per hour against the diesel. This would total some $50,000 per year per locomotive. That's how the nine eastern railroads justify the effort and cost of this new locomotive. For their part, the participating coal companies see the new locomotive as their best chance of staying strong in the railroad-fuel market. Both groups join in the view that reliance on long-term coal reserves is the only course that will safeguard our nation's oil supplies for a time of need.

How the LDC Moves Ahead

1. Farming Out Basic Problems

SUCCESSFUL USE OF COAL as fuel for a full-scale gas turbine—a milestone the LDC passed when it recently put into operation a Houdry process gas-turbine plant at Dunkirk, N. Y.—was the result of building, testing and improving component items of equipment in widely scattered laboratories and shops. The Houdry tests, still being run, bring together for the first time a great number of specialized developments that the LDC has plugged at since the start of the program in the spring of 1945 (*Coal Age*, October, 1946).

The basic points of attack in the over-all task were coal handling, combustion and fly-ash removal. To speed small-scale component development, projects bearing on these problems were farmed out to several established research institutions. At Johns Hopkins University, equipment was set up to prepare, pressurize and pulverize coal and burn it in a non-slagging combustor at rates of a few hundred pounds per hour. By Dec. 7, 1945, engineers were able to show that air, heated in a direct-fired coal-burning combustor and cleaned by cyclone separators, could drive a gas turbine. By 1948, Hopkins researchers had found out a good many facts about coal handling under pressure, air-jet pulverization, heat loss, coal feeding and spontaneous combustion of coal stored under pressure.

At Battelle Memorial Institute, small-scale combustion installations were made for both atmospheric and elevated pressures. A vortex combustion chamber, patterned after British designs, was used with some success at Battelle and Hopkins, but this soon was replaced with a simple, compact, film-cooled cylindrical combustor. Combustion under pressure was first tried in a small refractory-lined tube at Battelle, pulverized coal being provided from a pressurized tank, and war-surplus turbo-superchargers with air-cooled jet-engine-type combustors were operated on "bootstrap" cycle as early as November, 1946.

Meanwhile, at the Institute of Gas Technology, tests were run on high-velocity dust-laden air jets at 800 to 1,300 F to study erosion of turbine blades. Everything there pointed to the need for blade cleaning, rather than replacement, if conventional separators could be used to remove fly ash. Other studies at the institute covered various attrition devices to improve coal-atomizer performance, slow-speed screws to pressurize fine coal and partial gasification of coal in a vortex chamber.

Investigators at Purdue University, studying the effect of SO_2 on stainless steel, found that the small quantity of sulfur in coal did no measurable damage up to 1,800 F. Also, Southern Research Institute developed an air-balance device for measuring feed rates from a pressurized coal tank. Modifications of this device later were used in large-scale tests elsewhere.

2. Pilot-Plant Operation

BY MID-1946, a pilot plant had been built at Alco Products Div., American Locomotive Co., Dunkirk, N. Y., for burning coal at rates up to 1,000 lb per hr and under pressures as high as 60 psi-ga. A larger version of the Hopkins coal system was built, with a Standard Stoker piston coal pump to pressurize the coal. Crushed coal was fed from a pressurized tank by a variable-speed screw and an air-jet atomizer was used to pulverize the coal. Shop air at rates up to 1,000 lb per min was used to burn the coal, cool the combustor and chill the ash. A battery of small centrifugal separators removed most of the fly ash. The heated air was released through a pressure-reducing valve and was passed through a turbo-supercharger to determine the effect of fly ash on high-speed turbine blades.

Pilot-plant operation at Dunkirk revealed a number of major problems that had not been found in small-scale operation at atmospheric pressure. For one thing, though combustion efficiency was the best that then could be attained in cold-walled metal combustors—about 90%—the carbon remaining in the ash burned vigorously in the fly-ash separators. For that reason, the investigators turned to a ceramic-lined slagging combustor, in which combustion approached 98%, with about half of the ash appearing as moderate-size slag lumps. There was not enough carbon left in the fly ash to damage the separators.

When the Houdry turbine, with its superior facilities for full-scale testing, arrived at Dunkirk, operation of the pilot plant was discontinued. The investigators have continued their studies of an atmospheric-pressure, full-scale, horizontal ceramic combustor, which shows especially good promise for use with low-ash-fusion and low-volatile coals, but the all-metal combustor, now installed in the Houdry plant, has given such good performance under actual turbine conditions that it probably will be used in first tests of an experimental locomotive.

3. Studying Components

SMALL-SCALE low-pressure tests at Hopkins, Battelle, Dunkirk and elsewhere pointed up the need for working with full-scale equipment under actual turbine conditions. Accordingly, a test stand was set up at Fontana, Calif., where the

Test-Plant Experience Paves the Way to Early Trial of Full-Scale Unit

Kaiser steel mill had a spare blast-furnace blower providing a firm capacity of 100,000 cfm of free air at pressures up to 25 psi-ga. The Turbodyne Corp., a subsidiary of Northrop Aircraft, operated this phase of the LDC program.

At Fontana, coal-handling equipment of locomotive size was set up in the summer of 1947. Seeking a way to pressurize the coal continuously as it was withdrawn from storage, LDC engineers came up with a new-type rotary pump, built with extremely close clearances and capable of transferring fine-crushed coal from an atmospheric-pressure tank into a line at pressures up to 140 psi. Meanwhile, working along another line, researchers found that a film-cooled metal combustor could be used with acceptable range, efficiency and life.

Fly-ash removal still remained a problem. Because ash particles were spread over a wide size range, a two-stage removal system was devised. A louver separator was used in the first stage to concentrate large particles into a small stream of flowing air. This small stream was blown down to atmospheric pressure through an aspirating nozzle and the incandescent coal particles, which otherwise might have burned out the separators, were quenched by the aspirated cold air.

A battery of small cylindrical separator tubes of the straight-through type provided the second stage of fly-ash removal. Giving a vigorous spin to the air stream, these tubes concentrated the remaining solid particles into a small secondary air stream which passed out through a continuous blow-down system. Tests showed that very few particles larger than 20 microns were getting through the system and that most of these appeared to be agglomerates.

By early spring, 1949, combustion and ash-removal systems were developed to a point where it was believed practicable to run a large experimental turbine with pulverized coal as its primary fuel.

4. Test-Plant Construction

ERECTION OF THE HOUDRY PLANT at Dunkirk was started in May, 1949. The plant, originally tagged for a Russian oil refinery, was loaned to the LDC by the U. S. Bureau of Mines. Here's how it works:

Coal Preparation and Feeding—Fuel is provided from storage by an Iron Fireman stoker, which feeds minus 2-in coal to a Whiting high-speed impact mill equipped with a fan and a classifier. The fine coal from the mill—97% minus 100-mesh—is carried upward from the classifier by conveying air through an 8-in. pipe and into a separator in the top of the pulverized-coal storage tank. The separator is a combination of two American Blower separator tubes plus an LDC louver.

The quantity of coal in the storage tank is controlled by a single Fuller rotary level indicator immediately below the separator tubes. This control starts and stops the motor on the pulverizer feeder. The stoker operates in response to a level control in a small hopper from which the pulverizer feeder takes its supply.

A variable-speed drum feeder drops the coal into the top of a pressurizing rotary pump. Some trouble has been encountered at this point because of leakage, the pulverized coal being so highly fluidized that it flows through the smallest crevices, but the problem is being studied carefully and a solution is not far away.

Up to the time the powdered coal reaches the pressurizing rotary pump, it has been handled at atmospheric pressure. The pump pressurizes the coal continuously at whatever rate may be set by the drum feeder, the variable-speed drive on the feeder thus being the throttle for the plant. The coal is carried from the bottom of the pump by compressed air flowing in a 1¼-in line.

Air Supply—The compression system is set up to provide two streams of air—one to a coal combustor, the other to an oil burner. On the coal side, operating conditions expected on the projected locomotive can be simulated.

The compressor takes air from the atmosphere, drawing it through a metering section and a silencer. The compressor discharge, totaling some 220,000 lb per hr, goes into two lines—about 93,000 lb through the coal-burning component and the fly-ash separators, the remainder through the oil side. A preheater on the coal side provides the temperature boost that later will come from the locomotive regenerator.

Burning—The combustor now being used at Dunkirk, the fifth in a series developed and tested at Fontana, is made up of telescoping cylindrical sections of ⅛-in-thick stainless steel supported by external girders. Stainless steel here as well as in the fly-ash separators permits operation of the coal side up to 1,300 F. The present combustor is built without rivets because it was found that ash deposits built up in the wake of rivets. Air entering through the slots between rings cools the combustor and excess air mixes with the products of combustion through a number of large holes in the last 30 in of the combustor's length.

The present burner is a modification of a multijet device originally used at Battelle. Combustion efficiency has held consistently above 95%, with coal being burned at rates up to 1,800 lb per hr. After a continuous test of 32 hr, the combustor was found to be relatively clean and completely undistorted. Up to now, the coal flame has been started by an oil pilot light but developments are going forward that eventually will eliminate the necessity for continuous operation of the oil-fired igniter.

At a firing rate of 1,800 lb per hr, heat release in the combustor is approximately 750,000 Btu per hr per cu ft, or 6,000,000 Btu per hr per sq ft of cross-sectional area. Under these conditions, the combustor runs relatively cool and clean. There is very little slagging and nearly all the ash appears as a fine dry powder suspended in the combustion products.

On the oil side, the burner is similar to the film-cooled combustors used in jet aircraft. Good atomization at low combustion rates is provided by Peabody wide-range burners. The hot air discharged from the oil combustor is used to temper the far-hotter air from the coal side.

Fly-Ash Removal—Fly ash is taken out of the coal-side gas stream by a refinement of the two-stage operation devised for use at Fontana. The louver separator, which is the first stage in the system, was built by Turbodyne in line with data from American Air Filter Co., Louisville, Ky. It takes out some 50% of the solids in the combustion products and, in addition, eliminates stratification of the superheated air as it leaves the combustor. It has operated several hundred hours without visible deterioration.

The second stage in fly-ash removal is a battery of 18 American Blower tube separators arranged in primary and secondary banks. The 20,000 cfm coming from the combustor passes through the primary

bank, where most of the dust remaining after separation in the louver is transferred into about 10% of the air stream, which then passes through the secondary bank of separator tubes. In the secondary tubes, the dust is concentrated into about 1% of the original air stream and blown through a small nozzle. The remaining 9% of air, containing only a few remnants of fine dust, can be readmitted to the main air stream as it moves toward the turbine.

Tempering the Air Stream—The Houdry turbine does not tolerate temperatures higher than 1,000 F. Since the coal combustor and fly-ash removal system run at temperatures of about 1,300 F, the air stream must be cooled before it reaches the turbine. This is done by mixing in cooler air from the oil side of the plant. The mixing takes place at the outlet of the fly-ash separators, the resulting temperature being about 740 F. The mixing apparatus, designed at Battelle, is much the same as the cooling section at the end of the coal combustor—that is, a cylinder with large holes to admit air.

5. Test-Plant Operation

THE DUNKIRK HOUDRY PLANT is started by bringing the turbine up to approximately 2,000 rpm by means of a small steam turbine rigidly coupled to the high-speed shaft of the reduction gear. At that point, the burner on the oil side is fired and the turbine begins to accelerate. When the oil preheater on the coal side is ignited, the turbine speeds up still more. After the coal itself begins to burn, the turbine reaches its rated speed of 5,180 rpm.

At 10% overspeed, or 5,700 rpm, the overspeed trip valve comes into action, by-passing the turbine and opening the anti-pumping valve. On occasions, the turbine has been run at maximum permissible speed—6,000 rpm. Normally, turbine speed holds fairly constant, though temperatures in the combustor outlet vary as much as 25 deg above and below the mean value.

At present, there is no load on the turbine beyond the air that is blown down from the fly-ash separation system and the air that is discharged through the control valve. The Houdry installation was not intended to produce power but simply to show that coal can be used successfully as fuel for a full-scale turbine and to provide a further means of studying and improving coal handling, combustion and fly-ash removal. Later, in future applications of the plant, a 1,000-kw 60-cycle alternator probably will be coupled to the low-speed shaft of the reduction gear.

The plant now is being operated as many hours as possible each week to determine the effect of unremoved fine dust on the turbine blades. After the first 250 hr of operation, no damage or impairment of efficiency appeared, though some localized erosion of the stationary blades took place.

6. Planning Further Advances

LDC MEMBERS and engineers realize that the Houdry turbine now is operating at lower temperatures than a power-generating gas turbine will require. They are jumping at no conclusions. They are convinced, however, that they have hit on at least partial solutions for the basic problems of coal preparation, feeding, combustion and ash removal. And they will push ahead until a full-scale full-temperature gas turbine has been run on pulverized coal for thousands of hours.

That's why they are driving to build an experimental locomotive as soon as possible. Already, the locomotive has been laid out on drawing boards and most of the components have been built or contracted for. The Allis-Chalmers 4,200-hp gas-turbine power plant designed for 1,300-deg operation already has been completed and subjected to extensive tests. The Elliott turbine is being designed for 1,275 deg.

The Allis-Chalmers turbine soon will be moved to Dunkirk for stationary tests in an installation that will duplicate in every important particular the arrangement to be followed in the locomotive itself. If these tests are satisfactory, the power plant will be installed in a locomotive for extensive road testing—probably early in 1951.

The first coal-fired gas-turbine locomotive will be an articulated two-unit job with power plant mounted in one unit and coal-preparation equipment in the other. There will be a cab at both ends. Six-wheel trucks, identical with those used for 2,000-hp diesel locomotives, will be used. The electrical system also will be quite similar to that now employed on diesel equipment.

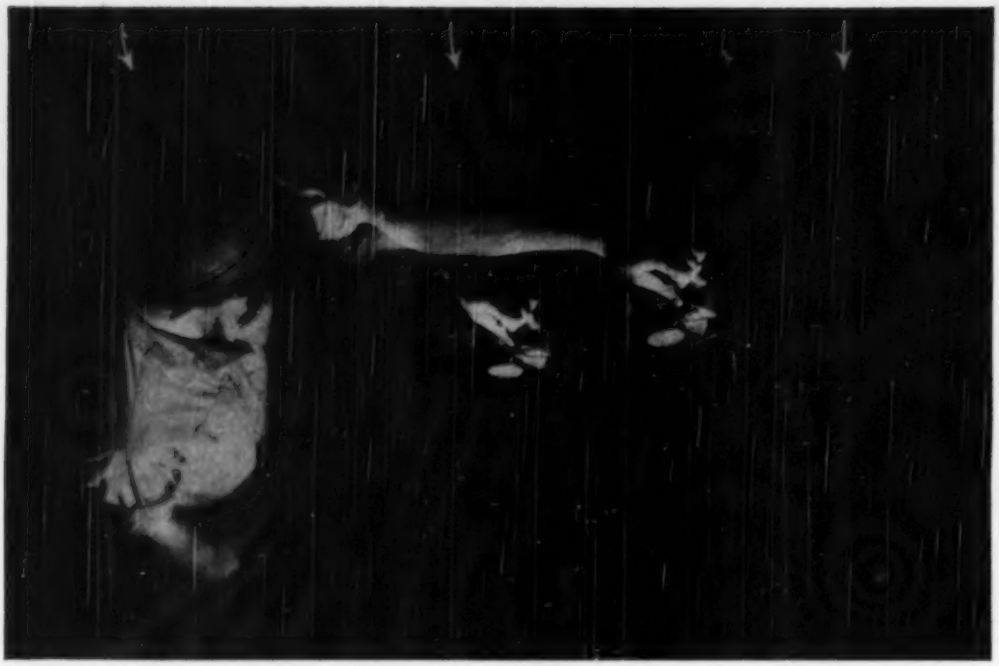
The locomotive will develop 4,200 hp, with power delivered to the rails in the neighborhood of 3,500 hp. Fuel consumption will vary from 2,500 to 3,600 lb per hr for normal loads. Under normal conditions, fueling stops probably will be necessary after 18 to 20 hr of operation. Fly ash will be stored in a hopper aboard the locomotive and probably emptied at refueling stops. Train heating will be provided by two 4,000-lb-per-hr oil-fired boilers —more than ample for a train.

How the Turbine Will Help Coal

THE COAL-FIRED GAS TURBINE will not bring a quick turnaround in the fuels-market trend in railroads, electric utilities or marine propulsion. In railroading, for example, a changeover to the coal-burning turbine will involve far more than merely hoisting out the old diesel engine and replacing it with a coal plant. The fact is, the undercarriage of the diesel is about all that can be adapted to the requirements of the new locomotive. Thus, even if the LDC shows that the coal-turbine locomotive will save money, replacement of diesels still will be a costly and therefore slow development. The railroads have put too much money into diesels to junk them faster than they wear out.

As for electric utilities, they already have achieved such efficiencies—0.73 lb of coal per kw-hr is the report from one of the newest plants—that the gas turbine probably could offer no additional efficiency in large central-station operation. But in smaller stations up to some 10,000 hp, particularly where condensing water is scarce and therefore costly, the turbine will offer stiff competition to diesel installations. In marine propulsion, there is an excellent possibility of using the coal turbine on tugs and lake and ocean-going ships.

Railroading, however, still is the most likely field for exploiting the merits of the coal-burning gas turbine. Low first cost, low operating cost, high efficiency, minimum replacement and maintenance and absence of smoke and cinders are its strong points. When at last it is erected on a locomotive chassis, it will be a strong new string in coal's bow.



CLOSE OR ARM'S LENGTH—what does it mean in measuring air velocity? Now, actual tests show . . .

How Operator Proximity Affects Anemometer Readings

By STEFAN BOSHKOV, Associate, and BURTON AMONTREE, Research Associate in Mining, School of Mines, Columbia University

IT IS GENERALLY KNOWN that one source of error in taking anemometer readings with the windmill (rotating-vane) type is the proximity of the operator to the anemometer. This results from the change in velocity and pressure patterns as air-stream lines change their course in moving about a stationary body. However, the magnitude of this error is not well known. Consequently the authors conducted experiments at the Mt. Hope magnetite mine of Warren Foundry & Pipe Corp., Dover, N. J., to determine quantitatively how large an error is produced by proximity of the operator to the anemometer.

It was decided that a Pitot tube check on anemometer performance might not reveal the magnitude of this error if the operator, in reading the Pitot tube, would stand as close to it as to the anemometer, since in both cases the flow pattern would be the same. Similarly, a check of anemometer v. Pitot tube in a small air conduit, with operator outside, would also be worthless.

• **Air velocity** therefore was measured with a constant-current varying-resistance hot-wire anemometer, which utilizes the principle of proportionality between cooling of an electrically-heated wire and the rate of flow of the air current passing over it. Its guaranteed accuracy, after calibration in a wind tunnel against a Pitot tube standard, is ±½%. Although this anemometer was employed successfully in the present study, its utility for general mine ventilation work has not yet been substantiated.

The instrument consists essentially of two units: (1) the probe containing the heated wire and (2) the case which includes the indicator, batteries, current-regulating element, switches, etc. The two elements are connected by a thin cable, whose length may be varied, thus affording a means of taking readings at remote distances from the site. The probe, which is a smooth tube about 6 in long by ½ in in diameter, was suspended from the center of the roof, halfway to the floor. Since all measurements were taken in drifts of approximately the same dimensions (9x11 or 10x12), the probe was 4½ to 5 ft above the ground. The thin cable connection to the instrument indicator box was carried along the roof and

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rib for a distance of approximately 30 ft downstream where the readings were taken.

●**Sites were selected as follows.** Sections of drift where measurements were taken were straight and as uniform in cross-section as possible. An attempt was made to set up at point 30 to 40 diameters away from any obstructions, such as bends, doors, chutes, etc., which would have influenced the velocity pattern. Complete series of readings were taken during periods when trips were virtually motionless, either loading or unloading, a considerable distance away. Initial readings were taken in an unobstructed section, with operator 30 ft downstream, and the velocity noted was regarded as the true velocity at this point. Then the anemometer operator was stationed at points 3 ft, 2 ft and 1 ft away from the probe and changes in velocity were observed. In all cases, the operator stood with his shoulder leading into the air stream and facing the probe, thus offering the least area of resistance to flow. Since, theoretically, the flow pattern is a function of the average velocity of the air current, tests were run at several velocities.

The plot of per cent error v. proximity appears in Fig. 1. Points on these curves represent averages of 5 to 8 readings, with a maximum deviation from normal of less than 2%. The plot shows that for any given air velocity, the error varies linearly with proximity.

● **Variations in error** compared to air velocity for given proximities of operator to anemometer are shown in Fig. 2. It is evident from the plot that a change in the flow pattern occurs somewhere between air velocity of 470 to 500 fpm, and that this change, exhibited as a faster drop in per cent error as the velocity increases, is more pronounced the closer the observer is to the anemometer. A brief theoretical explanation of this behavior follows.

The flow pattern is a function of both body boundary form and boundary roughness. The surfaces of separation, delineating turbulence, formation of eddies and negative pressures, are functions of these factors. The point on the body boundary at which these surfaces begin moves along the boundary with changes in the velocity of approach. An unstable flow pattern occurs at some value of this velocity at which the point of origin sud-

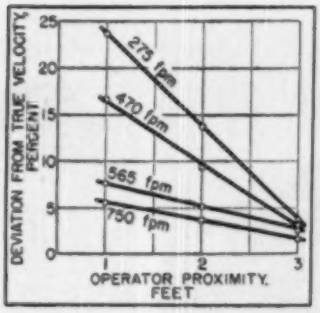


FIG. 1—PERCENT DEVIATION from true velocity in relation to operator proximity.

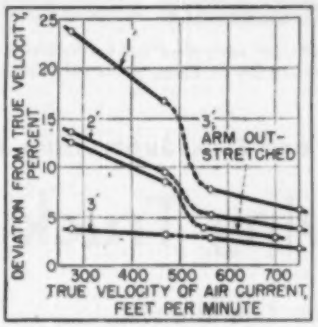


FIG. 2—PERCENT DEVIATION from true velocity in relation to true velocity of air current.

denly jumps from the upstream to the downstream side of the body. This is accompanied by a radical change in the flow pattern. Since at higher velocities the fluid tends to adhere closer to the body boundaries, the effect of velocity disturbances along lines perpendicular to the direction of flow is greatly reduced.

The data show that the errors tend to increase the readings in all cases.

● **Single spot-check readings,** as commonly employed in underground ventilation work, may be directly corrected for such errors. A continuous survey, where the anemometer has traversed the section, may also be corrected by use of the charts. It is true that in such cases the error may possibly be smaller at some positions during the survey, such as when the instrument is held above the observer's shoulders, but then it will probably be higher when the anemometer sweeps low, since in the crouched position the observer is bound to introduce a greater area of obstruction.

It is also noted, as part of the experiment, that the effect of an outstretched arm increased the error. At a 2-ft distance, this showed erratic results, because the obstruction to flow was too close to the exposed probe, and small variations in position of the fingers had a great effect on the readings. The probe, being of a different physical construction than the vane anemometer, cannot be expected to be affected similarly to the latter in cases where the obstructing body is in contact with the instrument. At a proximity of 3 ft the results yielded the curve shown in Fig. 2, indicating an appreciable rise in all points. It may, therefore, be safely assumed that in actual practice, the error may be even higher than indicated.

● **The following conclusions** may be drawn from the experimental data for the range of air velocities from 275 to 750 fpm.

In the case of anemometer air velocity measurements taken with the operator standing in the plane of the instrument:

1. The error increases with decrease in true velocity, for any given proximity of operator.

2. The error varies linearly with proximity and inversely with distance between operator and anemometer, for any given true velocity.

3. The velocity measurements may be expected to be inconsistent somewhere in the range of true velocities between 450 and 550 fpm, the erratic nature being more pronounced the closer the operator is to the anemometer.

4. The charts may be used to correct anemometer readings and to suggest procedure to be used under different flow conditions for insuring readings within a certain range of error.

5. The procedure of mounting the anemometer on a 1½- to 2-ft thin rod, perpendicular to the axis of the instrument, may materially reduce the error by increasing the distance between operator and instrument. Such procedure should be followed wherever possible.

Acknowledgment: The authors are indebted to F. G. Woodruff, mine superintendent at Mt. Hope, for permission to carry out the field work at the mine, and to Randolph Brogan, safety engineer, who so generously assisted in selecting the sites and in the experimental work.

EXPERT DRIVERS IN TOP-CONDITION TRUCKS will safely move maximum loads on schedule, and help you prevent situations as shown at right. Train your men—it's the only way you can be sure of their ability to handle expensive equipment.

Effective Driver Training and Fleet Supervision Will Help You in . . .

Achieving Truck Safety

Here's How You Can Have:

- » Better Drivers
- » Longer Truck Life
- » Fewer Repairs
- » Closer Scheduling
- » Higher Morale
- » Public Goodwill

SAFE TRUCK OPERATION in strip pits and about mining properties is an important consideration because of its direct influence on economy and efficiency. These desirable dividends—economy and efficiency—can be had through a well-planned program that includes careful selection, inspection and maintenance of equipment and closely controlled selection, training and supervision of drivers.

Most strip haulage is off-the-highway, and the basic responsibilities of management and drivers are those of preventing breakdowns resulting from improper operation and accidents involving vehicles of the company fleet. However, many companies use the highways in moving equipment and delivering supplies, and here the added responsibility of public goodwill enters the picture.

Top management must take an active interest in truck operation to fulfill these responsibilities to equipment and driver safety and efficiency. A full-time truck supervisor may be a profitable investment where the fleet is large. Where the fleet is small the owner or manager deals directly with his men, but the responsibilities must be met in either case.

To help truck owners attain greater safety and the efficiency which follows, the National Council of Private Motor Truck Owners, Washington, D. C., has prepared a series of 12 "Safety Texts." These texts have served as the basis for most of the following suggestions for organizing and carrying on a safety program.

• **Vehicle Selection**—Safety work starts with selecting the truck. This is nothing more than matching the truck to the job by choosing equipment that will safely carry the required loads. Truck capacity matched to loading machine capacity and truck power sufficient to negotiate maximum grades must be considered.

If your own experience has not proved to your complete satisfaction that the vehicles you use are the best for the job they have to do, seek expert advice from your dealer and the truck factory behind him, or consult strip mine owners with similar operations.

• **Inspection and Maintenance**—Planned inspection goes hand-in-hand with planned maintenance to keep down-time to a minimum, prevent breakdowns from mechanical failures and eliminate need for excessive numbers of standby trucks. Equally important as a safety requisite is regular preventive maintenance checks by properly trained mechanics. Inspections at definite intervals and prompt reports of truck deficiencies from drivers will help keep trucks in safe operating condition. Naturally, trouble must be remedied as soon as it is discovered or reported, because one bad accident caused by a mechanical defect usually costs more than several years of preventive maintenance and inspection.

Special attention should be given to brakes, tires, power train, steering mechanism, cooling system and lubrication by the driver during operation of the truck. A complete check should be made by the mechanic during the scheduled inspection. Fixing responsibility for these practices is a job for management, because management gains through

efficient and safer truck operation.

• **Key Man in Trucking**—Achievement of safe truck operation is the direct responsibility of the driver. However, management can retain control through wise selection, training and supervision. The responsibility and authority to insure good truck performance should be delegated to a competent person possessing qualifications for the job. Having the responsibility and authority to promote truck safety, a good truck supervisor must (a) possess proven ability to instill desirable attitudes in the men, (b) know company policy and base his actions on that policy, and (c) be capable of recognizing training needs and satisfying those needs.

Finding the right man and fitting him to the driver's job is the first and perhaps most important step in promoting individual efficiency and adjustment. It involves a careful analysis of each applicant's interest, skill, capacity and temperament, and the selection process should be designed to insure physical fitness, proper attitude and necessary skill on the job.

All drivers need not be huskies, but serious consideration should be given to the applicant's stature and strength in relation to the type of vehicle he will drive and the other demands of the work. A thorough medical examination is recommended, if possible. Special follow-up examinations should be made at regular intervals to detect deficiencies that may develop after employment.

A personal interview is indispensable in determining the prospective driver's attitude toward the job he is to perform. However, his attitude can only be treated as an indication of his ability to do a good job, but it will be worth knowing that he has the capacity to become a safe, intelligent custodian of your expensive equipment.

During the pre-employment interview particular attention should be paid to indications of his attitude with respect to the following:

1. His job.
2. His employer.
3. His equipment.
4. His family and responsibilities.
5. His fellow employees.
6. Other drivers.
7. Law-enforcement officers.
8. Safety.
9. Courtesy.
10. Receiving instructions.
11. Taking constructive criticism.
12. Self-improvement.

His aptitude or driving skill may be checked by examination of his previous employment records and references, standard reaction tests and driving tests under actual conditions. The latter test will indicate the amount of training the applicant requires if he is otherwise suited to the job.

• **Driver Training Vital**—The success of any truck safety program largely depends on the extent and effectiveness of driver training. Every new driver, regardless of past experience, should be trained in the proper handling of your equipment. This is the only way to be sure he knows how to handle the truck. Refresher courses for your present drivers will stimulate safety consciousness, for even experienced drivers can develop bad habits.

Good instruction should include both driver training and driver education. Training involves the formation of skills in handling the truck, or "behind the wheel" practice. Driver education instills ideas, information, appreciations and helpful attitudes in the minds of the drivers, thus helping them to become integrated into your haulage team.

The training program may be in the nature of a formal class or may be directed to the individual driver as he is hired. In either case, each man must become fully aware of vehicle functioning, his own maintenance responsibilities, traffic laws when driving on public roads, company rules and traffic patterns in off-highway operations and proper action in case of an accident.

First aid training cannot be overlooked in a well-rounded safety program. Such training makes men think of accidents in terms of human suffering, thus acting as a deterrent to carelessness. If accidents resulting in injury do occur, intelligent first aid saves lives and gives the victim a better chance for complete recovery. All these efforts are manifestations of the company's concern for employee and public welfare, and that is good business.

Hazardous situations arising out of weather and road conditions must be anticipated and the reactions of the driver developed to the point where he responds automatically to compensate for changes in conditions. Insuring proper reactions is a matter of thorough training and constant checking, and the driver will be proud of this acquired ability to operate safely under any conditions.

• **Fire Prevention and Control**—The threat of fires may come from faulty wiring and fuel systems, or from hazards originating in outside sources. Cleanliness of the vehicle, good mechanical maintenance, common-sense safety habits and fire extinguishers in working condition will minimize the fire hazard.

Fuel lines must be inspected frequently and all joints checked for tightness. Smoking while working about fuel is foolhardy, of course, but the supervisor must realize that accidents from this cause happen through carelessness and never through intent. Washing off oil and grease with gasoline is dangerous —steam cleaning is safer. Accumulations of oily rags or waste in cabs and tool boxes are invitations to fire.

Dragging brakes or soft tires often generate enough heat to start hard-to-extinguish fires. Defective wiring, improper fuses, inadequate grounding and other electrical shortcomings cause many truck fires. The list of fire hazards can be expanded, but these few serve to highlight the importance of inspection, maintenance and common sense as fire preventives.

• **Reporting Accidents**—Accident report forms, kept in each highway-operating vehicle, will be useful in getting pertinent information, even though the drivers involved may be somewhat rattled by the accident. A good system of reporting and filing such information is a definite asset in rating your fleet performance. Such reports will be especially valuable when they are completed "on the spot" at the time of the accident.

• **Primary Objective**—The aim of a truck safety program should be to train each driver in the art of defensive driving. A good defensive driver is one who makes allowance for lack of skill and knowledge in the other fellow, and who recognizes that he has no control over the unpredictable actions of others, nor over weather and road conditions. He concedes his right-of-way and makes any other concessions to avoid collisions. He is careful to commit no driving errors himself, and is defensively alert to avoid accident traps created by outside influences.

This type of driver and controlled maintenance can save money in truck fleet operation.

Hydraulic Power the Key to

Hydraulics Speed Mine Mechanization by Solving Difficult Design Requirements and Simplifying Machine Operation and Control—Greater Overall Efficiency, Less Maintenance and Elimination of Operator Fatigue Result

How Hydraulics Help Build Better Mining Machinery

1. Minimum space requirements and low weight-to-horsepower ratio permit lower manufacturing and selling costs of equipment, more compact machine design and greater versatility in operation.

2. Connecting hydraulic lines to a remote power source keeps electric driving motors to a minimum and out of danger zones, for increased safety.

3. Simplicity of control and operation eases operator's job, eliminates physical exertion and improves machine efficiency.

4. Self-lubrication of closed hydraulic system reduces wear and maintenance costs.

5. Power transmission by liquids eliminates adjustments necessary with many mechanical linkages.

6. Protected circuit is impervious to dust and dirt and is less affected by climatic changes.

By THE STAFF OF VICKERS, INC.
Detroit, Mich.

THE DEVELOPMENT of hydraulically operated mine equipment has been an important factor in the ever-continuing search for greater efficiency and lower operating costs that has brought coal mining from the comparatively recent stage of hand operation, in which a strong back and a pick and shovel were the prime requirements, to the present high level of mechanical mining.

In the earliest days of mining, attempts were made to develop some mechanized means of reducing the labor required to produce even a low-quality product. But the machinery that existed before the advent of hydraulics was not only cumbersome, it required so much brawn to operate it that operator fatigue nearly offset any advantages of mechanization.

Recognizing that the elimination of operator fatigue was as important a consideration as any other in the development of new equipment, mining-machinery manufacturers accordingly cast about for methods of simplifying the miner's job and reducing the physical exertion involved. Mechanical boosters and air and hydraulic controls were among those exhaustively tested on many types of mining machinery.

While nearly all these control devices were definite improvements, hydraulics was found to offer the best possibilities in compactness, speed of operation, simplicity of design, safety from explosion hazards, transmission of large forces with a relatively low weight-to-horsepower ratio, comparative freedom from effects of climatic conditions and extremely low maintenance requirements. In addition, it was found that with hydraulic equipment, moving parts, as were necessary in the old mechanical design, were at a minimum, with a resultant reduction in the mechanical adjustments required during operation. Subsequent improvements in production rates, economy, safety and overall efficiency following the utilization of hydraulic power have led to an ever-increasing number of mining-machinery applications.

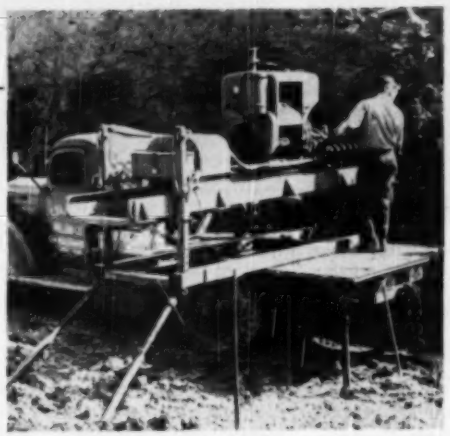
In modern strip and open-pit mining, nearly every phase of the operations involved in extracting, transporting and processing coal is in some way facilitated by the use of hydraulically equipped machinery.

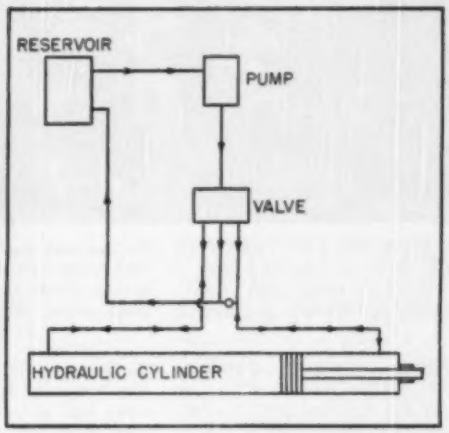
Much of the progress in underground mining also stems from the space saving, increased efficiency and safety, and low maintenance offered by hydraulically operated equipment. One major advantage of hydraulics in underground mining, in addition to the general overall efficiency, is the marked reduction in fire and explosion hazards. Only one or two explosionproof electric motors may be necessary to drive the hydraulic pumps on a machine and, from this single source of power, to distribute hydraulically all the other power required for the various machine operations.

The typical hydraulic applications described on the following pages are but a selected few of the many that may be found on coal-mining machinery, but they graphically demonstrate the application possibilities characteristic of this versatile power-transmission medium.

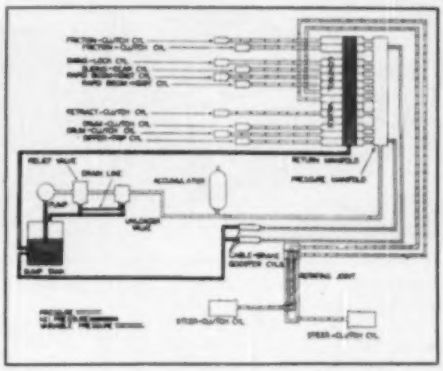
The continued growth in the utilization of hydraulic power in coal mining may be expected to keep step with the industry's unflagging drive for higher efficiency, better quality and lower costs. Not only is the industry constantly on the alert for new processes, methods and machines, but it is equally vigilant in its efforts to use present equipment and methods more effectively. Since the application of hydraulics to difficult operations has been a potent force in the recent progress of mechanical mining, it is only natural that the many advantageous performance characteristics of hydraulic power will be thoroughly considered in the development of new mining machinery. The conversion of presently used equipment to hydraulic operation also may be expected to continue apace, as in the recent past, as the varied features of such operation are more fully realized.

Modern Equipment Problems





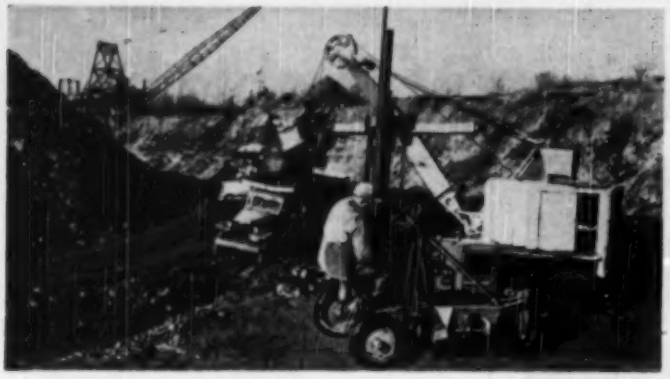
BLASTHOLE DRILLS—The horizontal blasthole drill above is completely hydraulic, with raising, lowering and other positioning controlled by simple manually operated valving conveniently grouped at one station. The drill is mounted on an A-frame with four elevators or legs which raise or lower the entire drill hydraulically. A B-frame moving back and forth within this frame, by hydraulics, positions the drill horizontally. The auger also is fed hydraulically at variable speed and with constant-torque characteristics that are unaffected by the resistance resulting from the different strata encountered. An integral relief valve provides automatic overload protection. How the hydraulic cylinder feeding the auger is actuated by a hydraulic pump through manually operated directional valving is shown in the diagram.

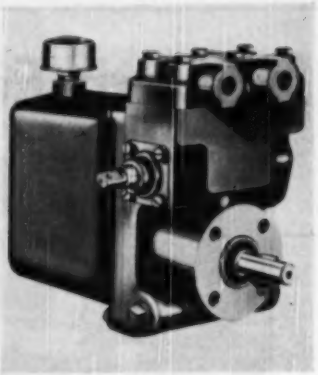


POWER SHOVELS once were huge lumbering machines that required the operator to be an ex-wrestler or weight lifter because of the tremendous physical strength needed to operate the manual controls. In addition, because of this complete lack of maneuverability, shovels usually had to be transported from one location to another. Today, however, hydraulic pressure controls steering and travel, combining automatic and precise control with maximum maneuverability and little operator exertion.

With the unit illustrated, all shoveling operations are controlled through clutches actuated by hydraulic pressure regulated with short throw levers by an operator who does not even have to leave his seat. Development of hydraulic controls for this shovel also permitted improvements in other operating mechanisms. Available hydraulic pressure led to the design of better swing and travel clutches with longer lining life and vastly more effective overall operation. The crawler-steering and brake mechanisms also were made more efficient and semi-automatic by utilizing hydraulic power and controls. As shown in the hydraulic-circuit diagram, a single pump furnishes all the power needed for the many hydraulic movements of the unit, which are actuated by the multiple control-valve bank indicated.

Improved Machine Design and Simplified Control Feature Hydraulics

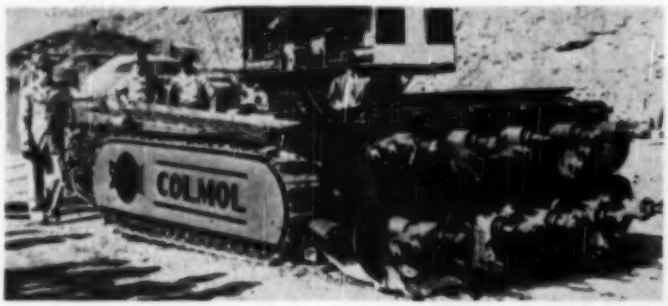


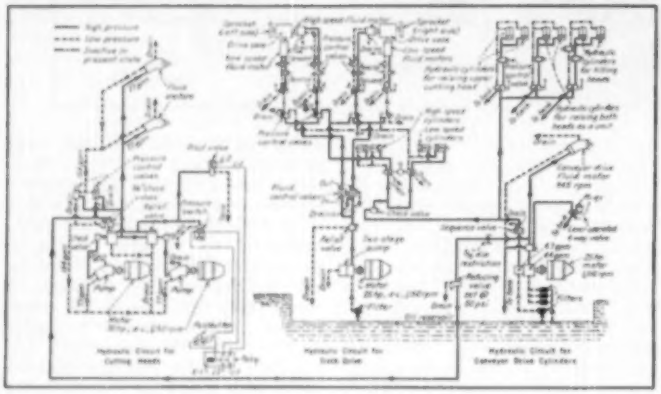


SELF-PROPELLED VERTICAL DRILL (left) is equipped with a small hydraulic power pack (right) for speedy and efficient positioning, feeding and con'rol of the auger. The power pack consists of a pump, control valves, tank, filter and automatic relief protection in a single unit and illustrates the compactness of installation possible with hydraulics, which is a factor in the small overall size of this drill.

OTHER SURFACE APPLICATIONS—Heavy-duty truck for coal haulage are equipped with hydraulic steering to make them as easy to maneuver over the roughest terrain as a passenger car. Former limitations in truck size were largely the result of the lack of maneuverability and the heavy physical strain on the operator. With hydraulic steering, however, 30-, 50- and 80-ton rear- and side-dump semi-trailer-type trucks are practical.

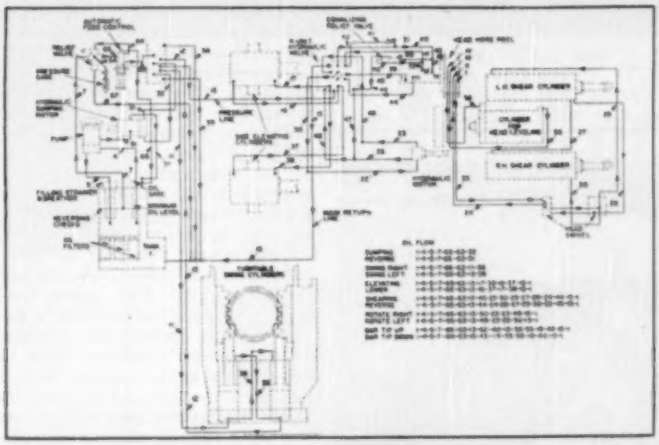
In addition, many of the wrecking and repair trucks, fuel and cable trucks, multiwheel supply and equipment carriers widely used in strip mining employ hydraulic equipment, not only for steering but also for the operation of winches, hose and cable reels. On the highly maneuverable bulldozer, raising, lowering and tilting of the blade is accomplished easily and accurately with hydraulic pressure controlled through a conveniently located valving panel on the dashboard.



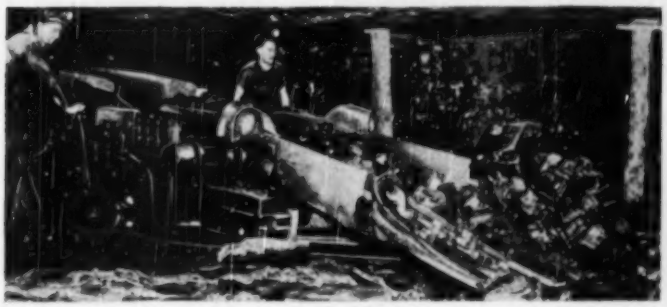


CONTINUOUS-MINING MACHINE—The completely hydraulic mining and loading unit shown here employs three main hydraulic circuits for cutting heads, conveyor and track drive, as shown in the accompanying circuit diagram. The upper and lower cutting heads are driven by two hydraulic motors, synchronized to prevent interference with one another by extending the transmission drive shafts through timing gear boxes. Track drive is effected through a two-stage pump to separate valving for each side of the track, so that each side may thus be operated independently at high or low speed in either forward or reverse. A hydraulic motor driving the sprocket shaft through a cone worm-gear drive powers the conveyor.

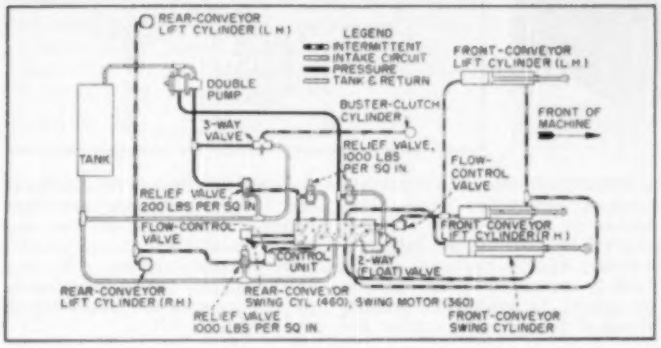
All controls are grouped at the rear of the machine to facilitate one-man operation and for the safety and convenience of the operator. With this unit, as with many other mining machines, space limitation was a guiding factor in its construction. Hydraulic drives were the only efficient means by which motors could be remotely connected to the driven elements without exceeding such limitations of available space.

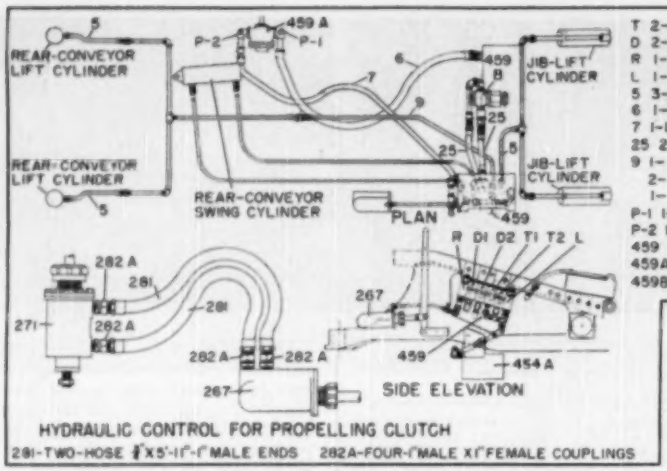


CUTTING MACHINES—This universal cutting machine requires only two electric motors, one driving the cutting chain and the other serving the hydraulic system, cable reel and crawler mechanism. Automatic feed of the cutter-head is controlled by a solenoid-operated hydraulic valve in the feed line. One hydraulic motor rotates the cutter-head and bar and a second controls sumping. Direct-connected hydraulic cylinders perform all other movements—elevating, leveling, feeding and swinging. A panel of six control valves, grouped within easy reach of the operator, regulates the machine's hydraulic functions. The location of the hydraulic motors powering the cutting and sumping operations and the convenient position of the control-valve panel are indicated in the accompanying circuit diagram.



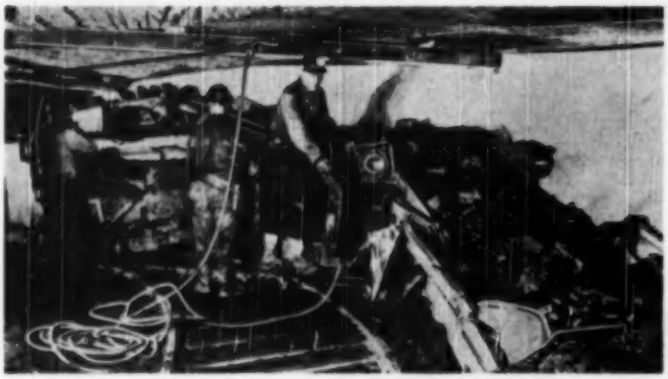
LOADING MACHINE—In this track loader, the hydraulic system is designed to provide simultaneous action of the conveyors, with separate pumps powering the front and rear conveyors. The front conveyor is raised and lowered by two double-acting hydraulic cylinders, one on either side of the unit. Lateral movement also is effected by a double-acting cylinder. A hydraulic motor provides the side-swing movement of the rear conveyor, which is vertically positioned by two single-acting cylinders. The relatively simple hydraulic system performing the complicated functions of this machine is illustrated in the accompanying diagram. One double pump provides the needed power through a multiple-control-valve bank. Relief valving automatically protects the system against overload and incidental directional- and flow-control valves offer the precise control that is characteristic of hydraulics.

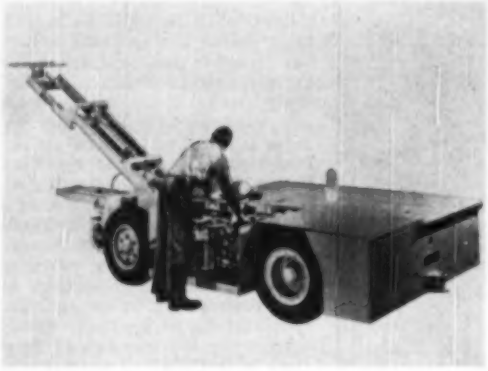


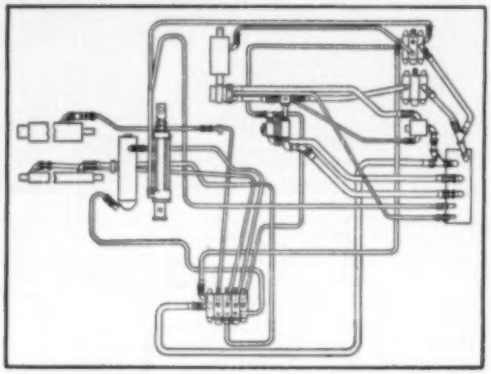


T 2-SINGLE-ACTING VALVES
D 2-DOUBLE-ACTING VALVES
R 1-RELIEF VALVE (SET AT 575 LB)
L 1-OUTLET PLATE
5 3-¾" RUBBER HOSE-19½" LONG
6 1-1½" RUBBER HOSE 5'-11" LONG-LOW PRESSURE
7 1-1" RUBBER HOSE 5'-11" LONG-HIGH PRESSURE
25 2-1" RUBBER HOSE 16" LONG
9 1-¾" RUBBER HOSE 5'-2" LONG
2-¾" RUBBER HOSE 8'-4" LONG
1-¾" RUBBER HOSE 16" LONG
P-1 1-PUMP INTAKE FITTING
P-2 1-PUMP OUTLET FITTING
459 1-¾" RELIEF VALVE
459A 1-PUMP
459B 1-MOTOR PUMP

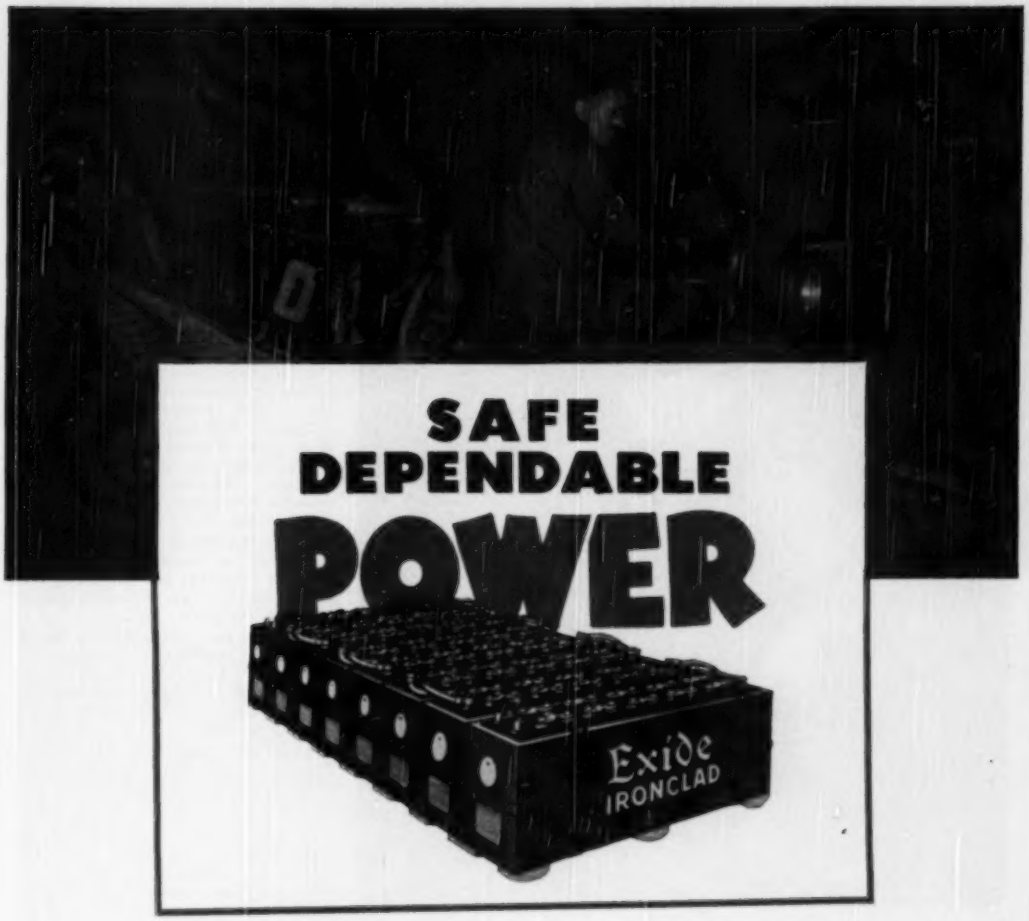
LOADING MACHINE—Only one 25-hp electric motor powers this loader, since all shoveling and loading operations are accomplished hydraulically. The machine is moved forward or backward on the rails through a hydraulically controlled reversing clutch. The shovel end is swung horizontally by a reversing hydraulic motor and positioned vertically through hydraulic cylinders actuated by hydraulic directional-control valves. The rear conveyor is hydraulically raised, lowered and swung laterally. Here again, controls are simple and positive in action and are conveniently grouped at the operator's station, which is so located that the operator is well back from the face and can clean up under unsupported roof without exposure to falls of roof or face. In the accompanying diagram, the reversing-clutch control is shown separately from the main hydraulic circuit.







TIMBERING MACHINE—Among the many other phases of underground mining that also have benefited from the application of hydraulic power and control is timbering. The timbering machine shown above consists of a pneumatic-tired chassis equipped with a hydraulically operated boom and crosscut saw. The boom lifts, swings 90 deg on either side, retracts and advances, and holds the crossbar against the roof with a 1,000-lb thrust, with all motions controlled hydraulically through valves at the operator's station. Positioning of the saw hydraulically and hydraulic steering are other features of the machine. The compact hydraulic installation possible in limited space and the positioning of the control valves conveniently for the operator are illustrated in the diagram.



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Put *full shift availability* into your battery-powered locomotives, trammers and shuttle cars. With Exide-Ironclad power, they'll handle as much load during the last hour as during the first. Also, Exide-Ironclad Batteries assure you:

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- exceptionally long life—proved in more than 100,000 heavy-duty jobs.

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"What Do You Owe Your Company?"

Your Salary Is a Company Investment, and Your Company Has a Right to Expect You to Return That Salary With Reasonable Interest—By Helping Your Company Make and Save Money, You Also Build a Better Living

YOUR SALARY IS A COMPANY INVESTMENT, and the company has a right to expect a fair return on that investment. Over the term of your service as a boss this investment in you continues to grow, and at the risk of being too cold in our appraisal, we state that your service is a process of repaying this investment plus reasonable interest. You see, if all workers in your company only repaid their salaries there would be no progress. No progress means no profit. And no profit in your company means that people with a desire and a willingness to invest their savings will shop elsewhere for investment opportunity.

There are four ways you can return your salary, with interest, to your company.

1. You can direct activities in your sphere of supervision so that you get the utmost production from your equipment, and loyal sustained effort from each of your men. In other words, by getting the most out of the company investment in equipment, salaries and wages, you *make* money for the company.

2. You can search for and eliminate waste and cut the direct and hidden costs of accidents by sincere safety effort. In this way, you *save* money for your company.

3. Every new workable idea helps cut the cost of production. Seize every opportunity to advance such ideas, and you will be *buying insurance* for your company by enhancing its competitive position.

4. Develop your own supervisory talents. Your talents are a company reserve for the future. They are *money in the bank.*

Making money for the company is your principal duty. Too often you have been called a non-producer, and this is an untrue statement. You are a producer although your day's work can't be measured in tons of coal. However, over a period of time long enough to include all normal changes in mining conditions, a well-supervised crew will out-perform a leaderless gang. The increased output is a direct result of supervision and the best boss produces the largest margin, other things being equal.

Can the supervisory methods of a good boss be tabulated so that new bosses may benefit? We think so, if personality is not considered at this point. Let's try to analyze the methods of a good boss.

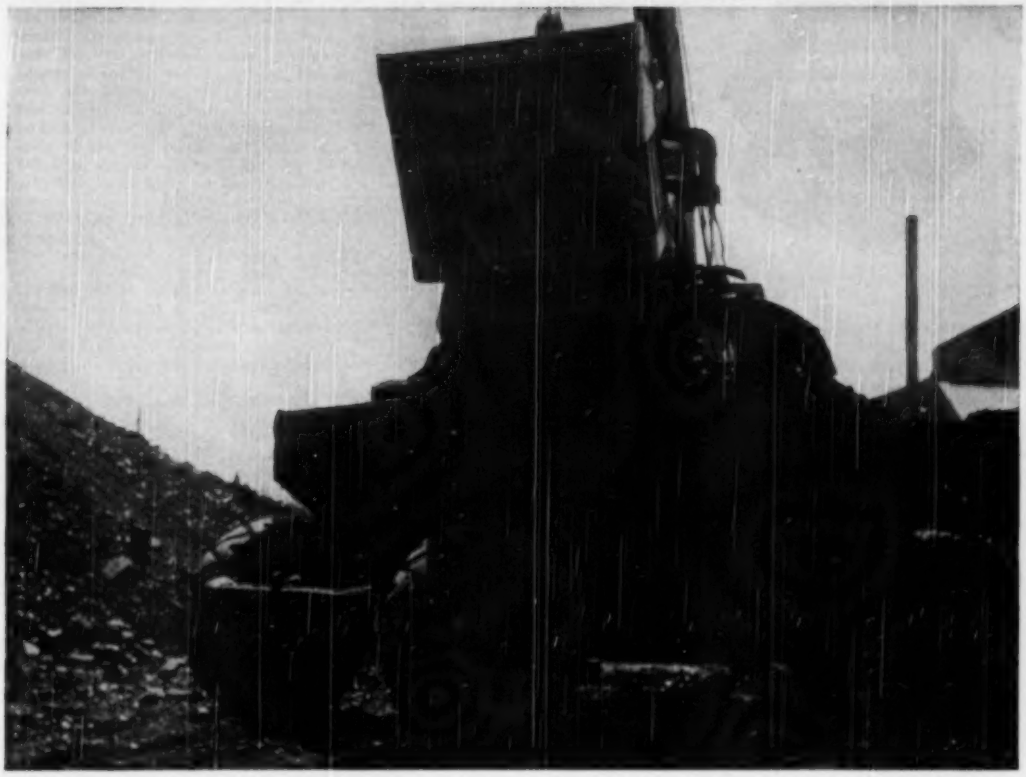
He realizes that each situation that confronts him is a problem to be solved—and he follows a definite procedure:

1. He studies the situation from every angle. He gathers his information and facts and does not neglect any trifle that might have a bearing on the current problem.

2. He reviews the means of attack at his disposal, including men, equipment and tools.

3. He considers all possible ways

B.F.Goodrich



ALL-NYLON tire record:

no blowouts, no bruise breaks, no flex breaks!

THE B. F. Goodrich ALL-NYLON tire is proving successful in mining operations all over the country. The record speaks for itself — up to now no blowouts, no bruise breaks, no flex breaks! And that includes severe operating conditions in mines where flex and bruise failures formerly were common.

Along with nylon, BFG uses weftless construction; no cross-threads in tire plies to hamper cord action and allow some cords to stretch out. Therefore, tire growth is reduced—tires last longer.

Where tire costs are high because of blowouts, flex breaks and bruise breaks, B. F. Goodrich all-nylon tires can make definite savings.

The new, all-nylon construction (used in the *Universal* and *Rock-Logger* tires shown at right) is typical of the continuous improvements being made in tires by B. F. Goodrich. Long ago, BFG engineers developed special types of tires for mining service. For more information on the way B. F. Goodrich tires can do more work and save you money, call your BFG dealer — or write directly to *The B. F. Goodrich Company, Akron, Ohio.*

To Help You Get Lower Costs and Better Quality

TO HELP YOU analyze your own operations against increased labor costs and growing competition from other fuels, COAL AGE in July will publish a special "New Mining Horizons" number—an entire issue devoted specifically to the latest means of cutting costs, boosting output per man and improving quality.

In it, compactly arranged for easy study and reference, you'll find: (1) a thorough analysis and evaluation of the modern methods and equipment that today are getting top results throughout the country; plus (2) a searching examination of the new methods or machines either under development or anticipated that are expected to make important contributions to the industry's progress in the next several years.

Be sure to watch for "New Mining Horizons"—Coming in July COAL AGE.

of solving the problem with available men and materials.

4. He weighs the relative merits of each possible solution with respect to safety, efficiency and economy.

5. He tries to find objections to these possible solutions.

6. He decides what he is going to do after studying merits and demerits.

7. He does it!

Neglecting any of these steps may mean the difference between success and failure. This is a system that becomes good supervisory habit with practice and application.

A pleasant personality, genuine concern for men and company, solid mining experience and a definite plan of action point up a good boss. He is making fullest use of everyone and everything under his supervision; thus he is making money for the company.

Saving money is a constant concern in competitive industry. Waste of time, materials and effort must be fully eliminated because each is now high cost. This was discussed in *Foremen's Forum* last month so we'll concede the point, ask you to review the reference mentioned, and move on.

The subject of mine safety comes up somewhere in every mining discussion, oral or written, and no one ever sermonizes on safety for the mere sound of the words. The subject is raised so often because of its importance. It is true that mine safety effort is prompted by humane considerations primarily, but it also exerts an economic pressure. Consider the effect on mining costs if all safety promotion is dropped. The direct cost of accidents will skyrocket and carry the larger hidden cost right along with it. You know that if you let down on safety these things will happen. Therefore, your safety effort is rewarded in reduced accident costs.

Preventing waste and promoting safety are two duties you must perform, in addition to getting coal out. By aggressive promotion of these activities you will not only be making money, you will be saving it. The actual amount you save can only be estimated by imagining conditions as they would be if no one combatted waste and accidents.

Providing insurance for your company—life insurance, at that—is one of your services to the company when you come up with new ideas. Here's what we mean by insurance—and how your ideas can provide it.

The price of coal is determined by what customers will pay for it, and there is a top limit. For your company to stay in business it must consistently produce at costs safely below this selling price, and the wider the gap between selling price and mining cost, the safer your company. Your cost cutting ideas help to widen this gap, thus increasing the margin of safety and, in effect, providing life insurance for your company.

Now, the question is: How do you get ideas? There is no royal road to romance, wealth, low costs or ideas, but we have a ready reference. In 1944 James Webb Young, an advertising man who made a living out of getting ideas, wrote a book entitled "Technique for Producing Ideas." Ponder these five steps advocated by Mr. Young, and see if this hasn't been your procedure, knowingly or otherwise, when you produced your best ideas.

1. Gather all the facts. Don't overlook anything.

2. Digest these facts. Sort, combine and arrange them.

3. Sleep on them. The idea is jelling in the nooks and crannies of your mind even though you think you have forgotten it.

4. You feel the idea taking shape and soon it presents itself in all its shining glory.

5. Refine and apply the idea.

This is actually the way ideas are born, aren't they? (Now if you come up with some good ones remember that *Coal Age* will gladly pay for their use in Operating Ideas.)

Of course, the decision to apply your idea may be someone else's responsibility. In advancing your brain children remember that no idea was ever presented for automatic adoption. Ideas are presented for constructive criticism by others, so you can expect that yours will be kicked around. However, if the idea is good it will stand on its merits, and the criticism will be good for it and you.

Developing your supervisory talents is an obligation you owe to your men, your company, your family and yourself. The industry is moving steadily ahead, and you must move with it. You have had to learn many new mining lessons in the past 10 yr and it is reasonable to assume that the coming decade will bring even greater changes.

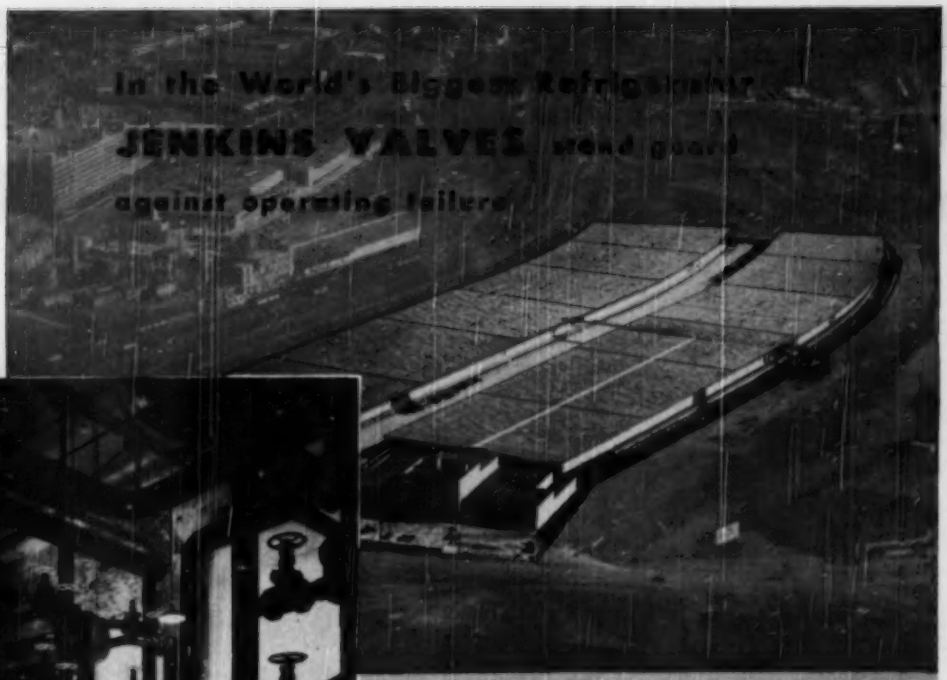
Perhaps the best way to keep abreast or ahead of these changes is to lay out a definite development plan for yourself. There are many avenues open to you and the choice is yours.

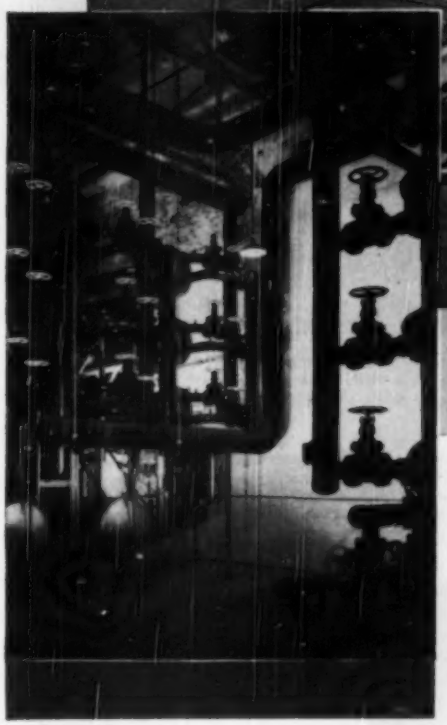
You can (a) enroll in formal night classes, (b) take correspondence instruction, (c) read for 20 min each night or (d) *think* for 20 min each night. Formal class and correspondence offerings include most of the subjects that interest supervisors. Technical studies, labor relations, public speaking, effective writing, economics and a number of other courses are open to you. Reading material, diligently consumed at the rate of 20 min each night will give you the equivalent of a normal college course every six months. Review your day's work for 20 min each night. You will pick out your own mistakes and be rewarded with better performance in the future. The key to self-improvement through any of these plans is regularity.

It isn't difficult to rate a boss's value to his company. It reduces to a decision as to whether the company would be as good as it is if no one was doing your job. Your mission is to become so effective in your supervision and so productive of results that your necessary position in the organization is assured.

The itemized plans for improvement previously outlined are not offered as a quick cure for all supervisory ills. Mining experience and mature judgment are still your prime assets. However, the suggested plans may help you organize your effort.

We don't think your company will ever try to rate you, personally, on a dollar-and-cents basis. You have a number of intangible assets that are worth a lot to the enterprise. Your company loyalty is one of them.





More than 1000 Jenkins Valves are used for control of steam, water, brine, in piping systems for refrigeration, heating, fire protection, sanitation and other essential services.

THE 22-acre Alford Refrigerated Warehouse in Dallas, Texas, is "the biggest refrigerated area this side of the polar ice cap." With millions of dollars worth of perishable goods entrusted to constant cold, valves, like all other mechanical equipment, must perform with unfaltering efficiency.

For this reason, and with the further objective of low maintenance costs, the Alford management standardized on Jenkins Valves. More than a thousand are used along the miles of vital pipelines.

Jenkins builds extra endurance into valves—proved time and again by low upkeep cost records in every type of service. Yet, *you pay no more* for Jenkins Valves, despite this extra value. Let the Jenkins Diamond be your guide to valve economy . . . for new installations, for all replacements. *Sold through leading Industrial Distributors everywhere.* Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros. Ltd., Montreal.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
TRADE JENKINS MARK

Jenkins Bros

Operating Ideas

Shop-Built Loading Head Easily Moved and Connected

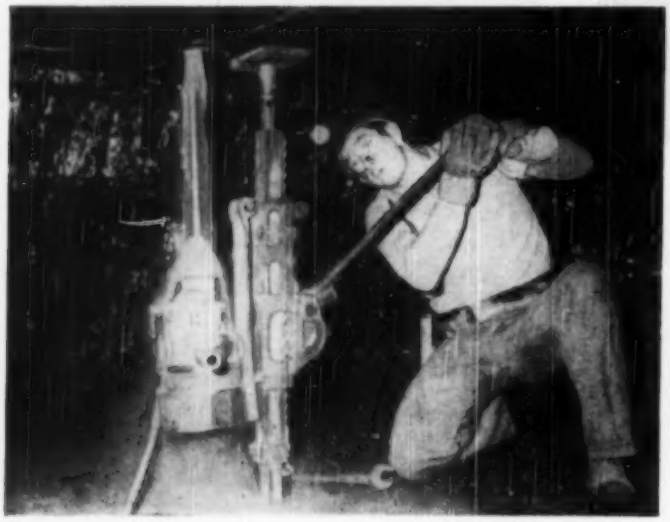
INCREASED PORTABILITY and easier installation have been incorporated in the new-type loading head designed by Andy Doci, chief mechanic, Lorado No. 2 mine, The Lorado Coal Mining Co., Lorado, W. Va., and built by the shop staff under his direction, according to a recent issue of the *Lorain-Lorado Journal*.

The unit illustrated actually is the third such portable elevator for loading from Joy shuttle cars to mine cars built in the shop during the last year. At the time the photograph was taken, a fourth was under construction. The company often has found it advantageous to build special models of equipment to meet its requirements even when commercial models are available. All work on the machines was done by the shop staff when they were not otherwise busy on regular production units or maintenance.

This new-type loading head is about 18 ft long and is powered by a 7½-hp T-Type motor. It is mounted on a cam stand and can be let down on the mine track when it is to be pulled to a new location. To speed connection to the power source, the unit has a contact box with two contactors bolted on the side, which eliminates the need for rewiring when it is moved.

SHOP MECHANICS at Lorado No. 2 mine, shown with the third of the new-type loading heads they have built, are: Eddie Cook (left), Mike Cook, Vincent Gondol, Andy Doci, chief mechanic and designer of the unit, Noah Lusk and Billy Maynard.

To move the loading head, it is quickly disconnected from the power, let down on the track and hauled away. At the new location, the contactors are plugged in and the unit is immediately ready for operation.



Timber Jack Holds Drill for Roof-Bolt Drilling

ABUNDANT drilling power, easily and speedily applied, reportedly is obtained by utilizing a mine roof jack to feed an electric coal drill in drilling vertical holes for roof-bolting at a large West Virginia operation in 42-in coal. As shown in operation in the accompanying illustration, the timber bracket has been removed from the Templeton-Kenly No. 366 mine-timber jack and an adapter attached for holding the drill vertically. Roof-bolts used at this mine range from 1-in mild steel down to ⅝-in in diameter.

BATTERY-POWERED SHUTTLE CARS ARE SAFER ALMOST 2 TO 1!

PROVED BY SURVEYS!

Battery-powered shuttle cars have the following advantages demonstrated and proved:

SAFETY
Only battery cars are "permissible"

PRODUCTION
Can produce 10% more tonnage
Deliver more tons per man shift
Give 22% more ton-miles per shuttle car hour

PERFORMANCE
Include all design advances
Travel 25% faster
Discharge 30% faster
Are more dependable and predictable
Handle supplies easier
Reduce shuttle car change time
Can gob underground
Promote section efficiency

COST
Equal capital cost
Produce coal in shuttle car sections for approximately ½c less per ton —in hand-loaded sections, as much as 75c a ton

A "MUST" FOR CONTINUOUS MINING MACHINES

Battery-powered shuttle cars enable continuous mining machines to work 10% more of the shift.

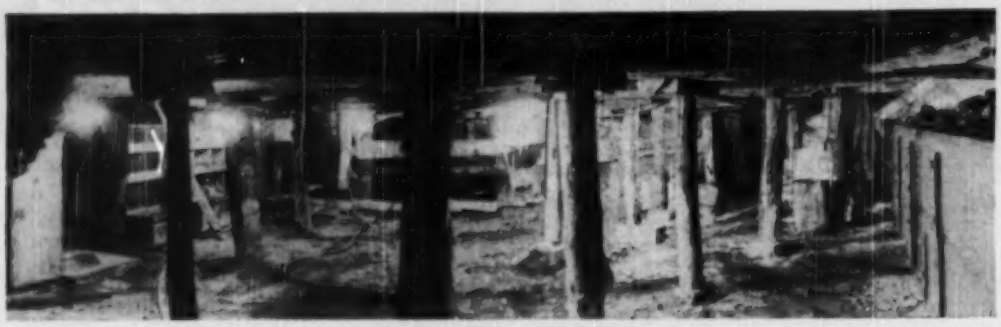
AND . . .

Two-shift operation is now possible with only one set of batteries.

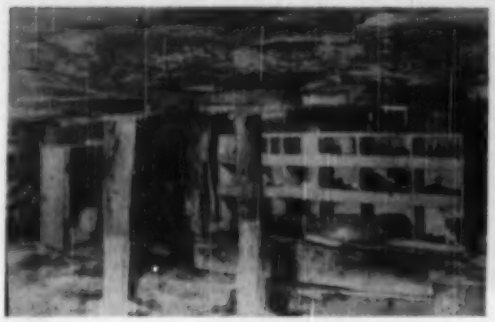
GOULD

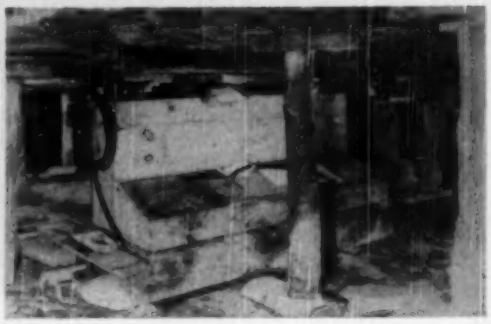
STORAGE BATTERY CORPORATION

Underground Storage Promotes Better Working Conditions



GOOD HOUSEKEEPING and storage space for all materials on hand make this section a safer, better place to work.



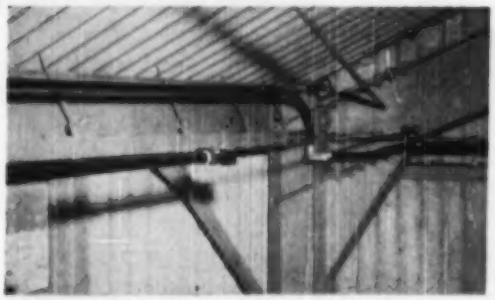


STORAGE BOX for parts has individually marked bins on one side (left) and a bin for larger parts and tools on the other side, which serves as a desk when the lid is down. The box is mounted on skids for easy moving.

A STORAGE PLACE for all materials on hand is an important part of the good housekeeping practiced on the 8-Right section of Mine No. 15, West Virginia Coal & Coke Corp., Stirrat, W. Va., shown above. The section recently was chosen as one of the most outstanding in the mine and illustrates the results of teamwork between the men and their foremen, reports the company's publication, *Safety News*. Leslie Evans is foreman on the day shift and Herman Hannah is foreman on the evening shift.

The lower photographs show the two sides of a box built for storage of small parts. The bins for storing usable parts (left) have individual markers to indicate the parts they contain. The other side (right) provides for larger parts and tools and when closed serves as a desk. The entire box is mounted on heavy wood runners so that it can be easily moved to each new set-up by hooking either a chain or cable to it.

Suspension Cable Supports Lighting Conduit



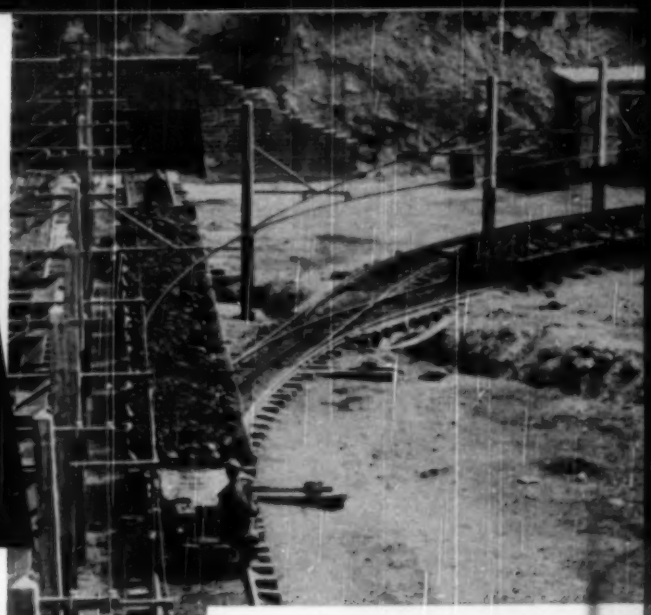
GALVANIZED STEEL WIRE, anchored to structural members as shown, eliminates special ceiling braces and saves the time and money necessary to fasten conduit to rafters.

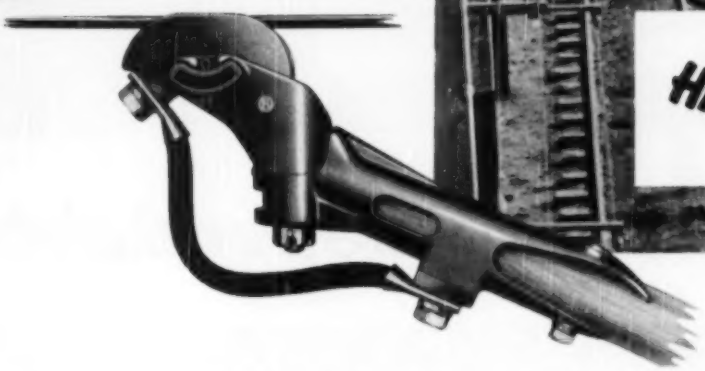
SAFETY, ECONOMY AND STRENGTH are advantages of the lighting conduit suspension system developed for use in surface buildings by William Hoffman, chief electrician, Porter Tunnel, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.

The conduit is suspended from ⅜-in galvanized steel guy wire, which is anchored to hooks in the steel frame of the building. The suspension wire also is strapped to steel rafters along the length of the building. The conduit is attached to the suspension wire by clips placed at 5-ft intervals. Clips are made from salvaged ground strap, which is wrapped around the conduit and suspension wire, and held in place by ¼-in bolts. Each outlet box also is fastened to the suspension wire by a strap.

Use of this suspension system eliminates the need for extra steel members as anchor points for the conduit, provides high flexibility and has enough strength to do the job with an adequate safety factor. The system has served effectively at Newkirk colliery, where Mr. Hoffman was chief electrician before coming to Porter Tunnel.

For Heavy Duty Haulage, USE SHOES

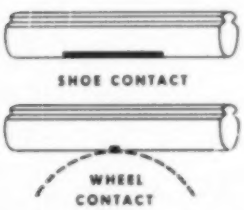




HAULAGE WAYS JUNIOR

● If you want a smooth, dependable flow of power from the trolley wire to the collectors of your main haulage locomotives, use a collector that presents the largest possible area to the wire. That's why shoes — O-B Type-L Trolley Shoes — are better suited to heavy duty haulage than trolley wheels. Here's the reason: Shoes, in the first place, do present a larger surface for current transfer than the wheels. Because of this, current passing from the wire to a trolley shoe passes through what might be called a "line" contact, as contrasted to the "point" contact between the wire and a wheel. An abrupt jog in the wire will break the contact between a wheel and the wire, interrupting the power flow. When this happens, there is a good deal of arcing, for the flow of current has been concentrated through a very small area. However, the current flow is distributed through a series of points in the case of the shoe, and since the shoe is less likely to break contact with the wire, the chances for power interruption and arcing are much less. You see, the pivotal center of the shoe is located in the center line of the wearing surface, eliminating any tendency for the shoe to tilt because of friction between the shoe and the wire. Further, a jog in the wire, while depressing the leading end of the shoe, will press the trailing end more firmly against the wire. The reverse is true when the center of the shoe passes the jog.

Your O-B representative will be glad to tell you more about the advantages of shoe current collection. Ask him what it can do for you in your mines.



Field tests show that under identical conditions of heavy electrical load, trolley shoes outlast wheels many, many times. This is because of reduced arcing and burning with the use of shoes. The sketches show the difference in surface covered by the wheel or shoe in contact with the wire.

Ohio Brass

MANSFIELD OHIO, U. S. A.

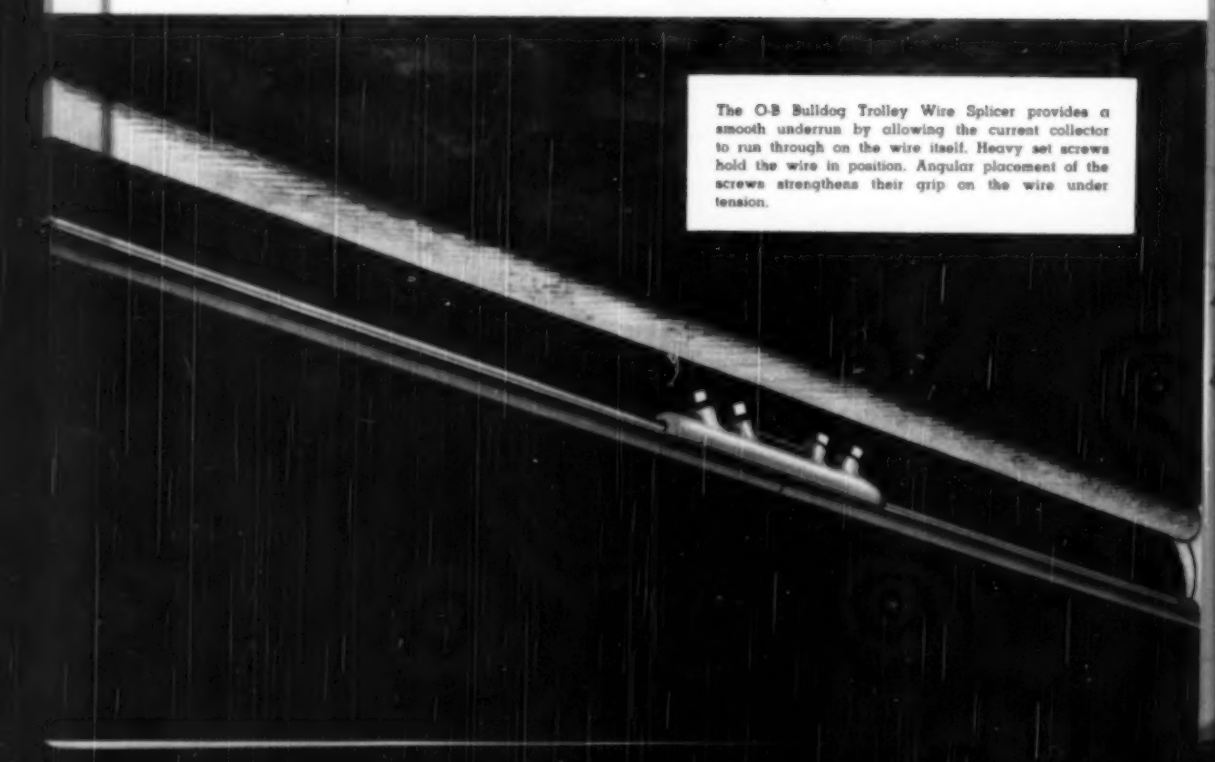
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS

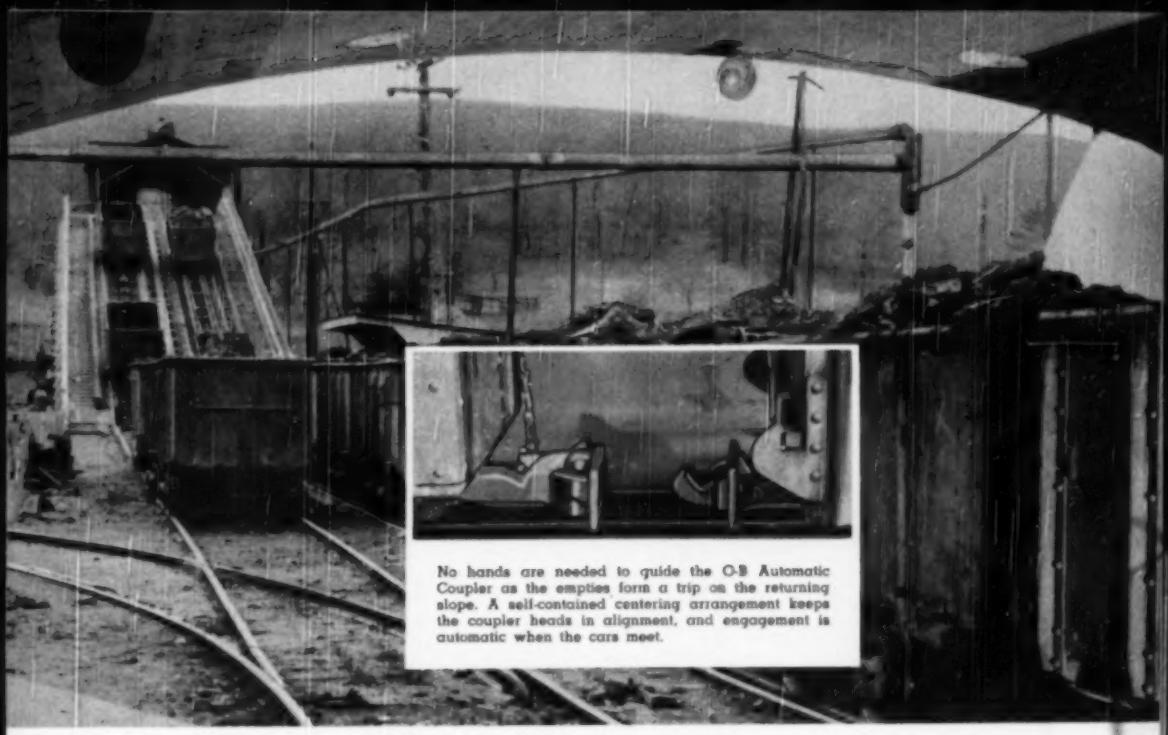
JUNIOR

For Coupling Cars or Splicing Wire

... O-B Dependable



The O-B Bulldog Trolley Wire Splicer provides a smooth underrun by allowing the current collector to run through on the wire itself. Heavy set screws hold the wire in position. Angular placement of the screws strengthens their grip on the wire under tension.



No hands are needed to guide the O-B Automatic Coupler as the empties form a trip on the returning slope. A self-contained centering arrangement keeps the coupler heads in alignment, and engagement is automatic when the cars meet.

Equipment Does it Best

● There's an important similarity of function between O-B Automatic Couplers and O-B Wire Splicers. It's a function that you need for smooth, speedy operation anywhere along the haulage way. It's the ability of each to make a secure, dependable connection.

For couplers, this is important. High speed haulage and dumping operations demand a coupler that joins positively on impact as well as one that eliminates dangerous slack between cars.

For splicers, a secure, dependable connection is equally important. High initial tensions, as well as countless repeated strains of passing current collectors, call for a splicer that keeps the wire in its installed position, with ends butting together, for indefinite periods of service.

O-B couplers and O-B splicers, in company with all O-B equipment, have another characteristic in common — they have the strength and mechanical ability to surpass the demands of rugged mine service. Select sturdy O-B products for your job from the O-B catalog No. 27.

Ohio Brass

MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS
JUNIOR

Get this Useful Roof Bolting Information

Installation of O·B Roof Bolting Expansion Shells and Plugs Thoroughly Explained

● Here's information on roof bolting technique that is of interest to all mining men. If you are considering bolting for roof support, or if you are already using roof bolts in your mine, you will benefit from a study of this material. It consists of accurate, useful data on the O-B Roof Bolting Expansion Shell and Plug, gathered by O-B field engineers, and published by the Ohio Brass Company in a group of conveniently-sized booklets.

Different phases of bolting procedure are covered by text, photographs and line drawings. Important factors governing successful bolting practice are thoroughly explained. You can get this information easily; we'll send one or more sets for you to distribute as you choose in your organization. Use the coupon below to give us your mailing instructions.

4047-M

OHIO BRASS COMPANY
Mansfield, Ohio

Please send _____ sets of bolting information booklets to me at the following address.

NAME_____

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Ohio Brass

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CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Pilot Lights on Fireboss Board Spot Safety Conditions

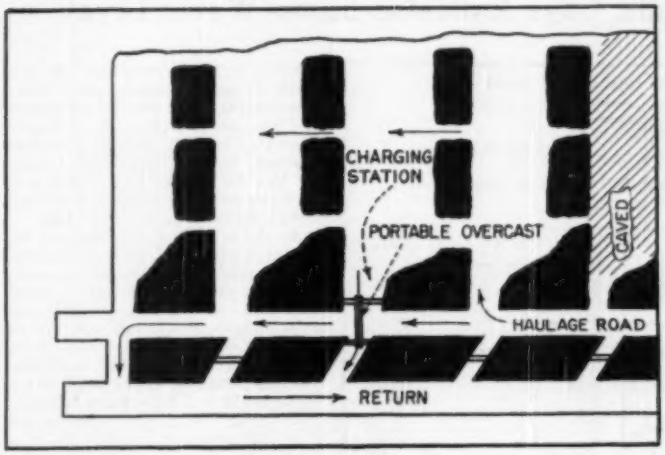
THE CONTROL BOARD of the new air-cleaning plant at the Bunker mine of the Trotter Coal Co., Cassville, W. Va., gave C. D. Campbell, master mechanic, the idea for the new fireboss board mounted in the portal building near the main slope and tipple. The mine operates two shifts and ships 4,000 tpd of clean coal.

Westinghouse Oil-Tite selector switches and matching Type O. T. Oil-Tite red and green pilot lights are used. Mounted at the top of the board alongside the words "Bunker Mine" are the two lights indicating safety conditions for the entire mine and their controlling switch. Two lights and a switch also are mounted opposite the name of each underground section. The lamps themselves, behind their red and green lens, are 110-v 6-w candelabra-base bulbs.

Section names at the left of the board are printed on strips of ¼-in hard-pressed Masonite, which are held by aluminum molding and can be slipped out for repainting or rearrangement. All the green lights were burning brightly at the time the photograph was made, but since a flash picture of short exposure was taken, the lights appear to be unlighted.

NEW FIREBOSS BOARD at the Bunker mine portal of the Trotter Coal Co. has switch-controlled red and green lights indicating safety conditions for the entire mine and for the individual sections.

Portable Overcast Ventilates Charging Station



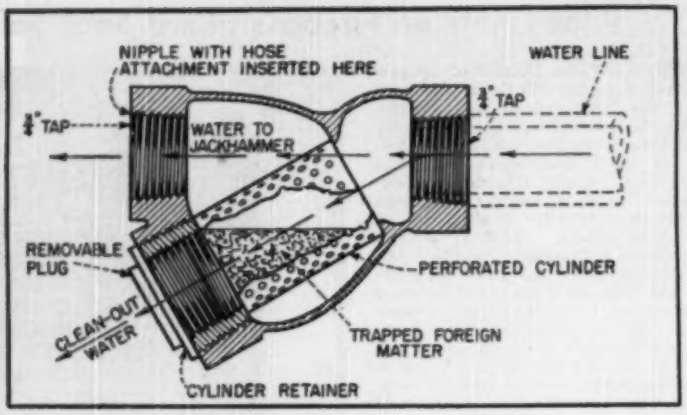
A LOW-COST battery-charging station to serve each loader-shuttle-car mining unit was made possible by the use of portable galvanized-steel overcasts, according to a description of the practice submitted by James Thompson, Pennsylvania compensation-rating inspector, Philipsburg, Pa.

The overcast conduit is made in 3-ft-long joints of 6x36-in cross-section, which are bolted together, or nested like ordinary stovepipe, to furnish the length of duct required to span the intake airway.

In practice, the charging station is set-up in a forward room neck and a stopping erected to separate the station from the intake airway. The steel duct carries the gases produced in charging through this stopping, across the intake airway and through the stopping in the crosscut directly to the return airway. A regulator in the duct controls the quantity of air moving through the charging station.

Ideas Welcome!

WHO DOESN'T WELCOME good cost-cutting efficiency-getting ideas nowadays? That's why many COAL AGE readers make it a point to regularly check this section for ideas they can use at their property. Why not help others by sending us the operating, electrical, maintenance or safety ideas you've successfully put to work? COAL AGE will gladly pay you $5 or more for each acceptable one, on publication. Just write them in your words—we'll edit them if necessary. Address: The Editor, COAL AGE, 330 W. 42nd St., New York 18, N. Y.



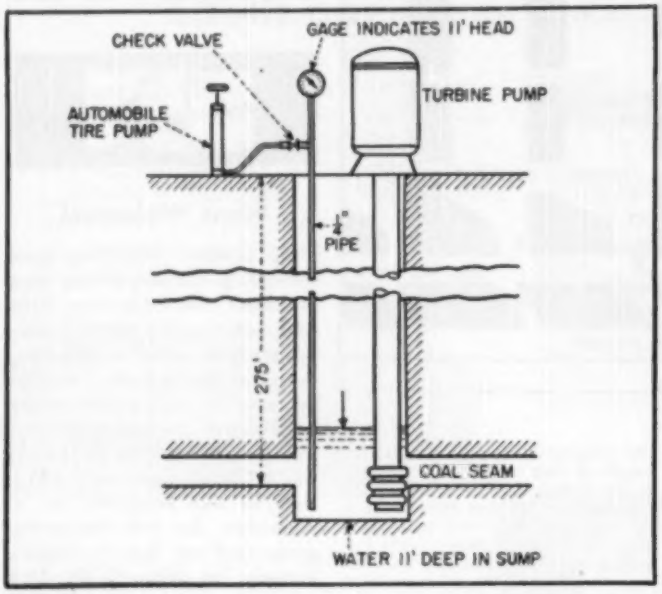
Water-Line Strainer Prevents Jackhammer Blockage

AN EASILY CLEANED TRAP for removing dirt, scale and other foreign material from water lines leading to wet-drilling equipment is the Nicholson strainer shown here. The fitting is a ¾x¾x1-in wye containing a perforated cylinder, which permits uninterrupted water flow but prevents passage of any particular matter into the jackhammer. This material drops into the plugged branch of the wye and is washed out of the line by the stream of water when the plug is removed at intervals.

The water hose to the hammer is attached to a short nipple in the water-discharge end of the fitting, thus keeping the strainer as close as possible to the jackhammer. New pipe is added to the line behind the strainer.

Previously used in steam and liquid lines in industrial plants, the strainer has been successfully applied to wet-drilling systems by several coal and metal mining companies. It has been effective in reducing time losses, eliminating jackhammer blockage and promoting smoother wet drilling.

Surface Air-Pressure Gage Indicates Sump Water Level



AIR PRESSURE GAGE on the surface simplifies determination of water depth in the sump hundreds of feet below.

SIMPLICITY and reliability are two highly priced mining-equipment characteristics that are particular features of the sump-water-level indicator originated by C. C. Ballard, electrical engineer, New River Co., Mt. Hope, W. Va., for use at deep shafts and boreholes where deepwell-type turbine pumps are installed on the surface.

As shown in the drawing, the indicator is assembled from an automobile-tire pump, a dial-type air-pressure gage calibrated in feet of water head and some ¼-in pipe. To make a reading, the station attendant gives the hand pump a few strokes until the gage reading remains constant. The final reading on the gage is the water depth in the sump 275 ft below.

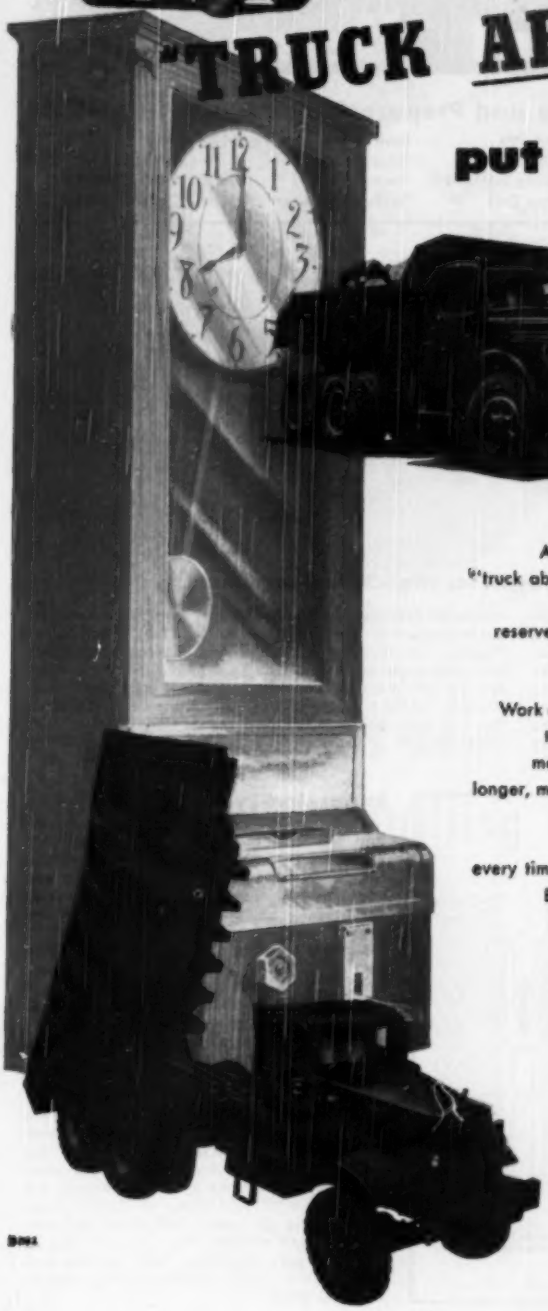
This type of gage is used at the Dry Hill pumping station, which is reported to be the largest vertical-turbine mine-dewatering station in the world. Four 5,000-gpm 450-hp A. D. Cook pumps are installed at the top of a 10x12-ft shaft 271¼ ft deep. The station dewaters an 8,000-acre area comprising the Skelton, Sprague and Mabscott mines.

HOW ABOUT YOUR GOOD IDEA? —Don't keep it a secret! See the notice on p 101.

...Cut Down

"TRUCK ABSENTEEISM"

put MACK TRUCKS on your job



"Truck Absenteeism," like its human counterpart, disrupts the efficiency of your business . . . adds materially to your costs. Actual job records prove that with Mack trucks on the job "truck absenteeism" is reduced to an absolute minimum. That's because Mack trucks have built-in durability . . . extra reserves of strength and stamina. Because they're better built, they're better able to stand up to the demands of hard-working, day-in, day-out service. Work done on the job will always be the one true yardstick of truck value. Figured that way, every Mack truck gives full measure — and more — in round-the-clock dependability; longer, more trouble-free mileage life; sustained earning power; and rock-bottom maintenance costs. On the job — and on the job records — it proves out every time: "YOU GET MORE WORK *OUT* OF MACK TRUCKS, BECAUSE MORE WORK GOES *INTO* MACK TRUCKS."

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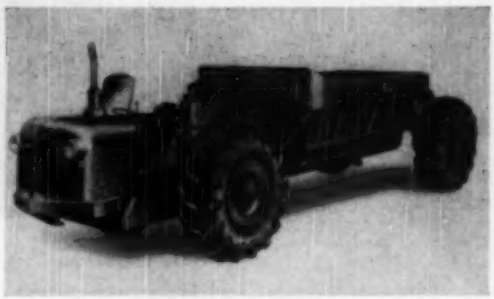
Equipment News

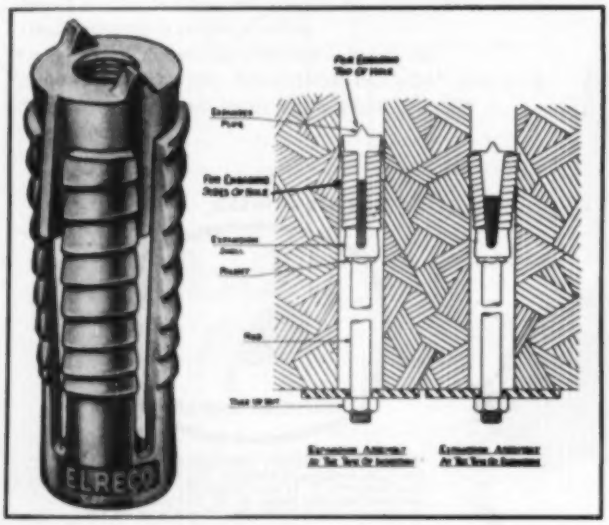
New Equipment for Better Mining and Preparation . . p 104 to p 122

Air Compressor	Coal Crusher	Generator Sets	Roof-Bolts	Truck Body
Belt Control	Conveyor Pulleys	Grease Gun	Shovel Loader	Trolley Signal
Bin-Feed Device	Earthmovers	Non-Melting Lubricant	Tractor	EQUIPMENT SHORTS
Classifying System	Fire Truck	Prospecting Drill	Tractor-Compressor	AND PUBLICATIONS



Self-Propelled Scraper and Wagon for High-Speed Earthmoving

Two new additions to the LaPlant-Choate line include the self-propelled rubber-tired TS-200 Motor Scraper with a 9-to 12-yd capacity (left) and the TW-300 Motor Wagon (right). Powered by a 145-hp Buda diesel engine, the TS-200 scraper has a top speed of 23.44 mph with the standard transmission and 27.4 mph with optional transmission. According to the manufacturer, the unit features ease and safety of operation through double-acting hydraulic steering, hydraulic scraper control, four-wheel air brakes and a dual-fluid power unit. The TW-300 Motor Wagon is powered by a 225-hp Buda supercharged diesel, has a top speed of 21.2 mph and a capacity of 14 yd struck and 19 yd heaped. Doors are hydraulically controlled. Bulletin A1188A on the TS-200 and Bulletin A1124 A on the TW-300, are available.—*LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa.*



Expansion-Type Roof-Bolt

New Elreco roof-bolts available with ⅝- and ¾-in-diameter rods in any lengths are said by the manufacturer to offer several design features that improve holding and performance characteristics. To provide for oversize and inaccurately drilled holes, the expander plug and shell expand to 1 11/16 in from the minimum insertion diameter of 1¼ in. Turning of the expansion assembly in the hole and its resulting failure to expand is prevented by reverse-tapered wings on the plug that engage the sides of the hole, together with two sharp lugs on the top of the plug that engage the top of an accurately drilled hole that is otherwise too large to be engaged by the wings. Greater holding strength is secured with this-type assembly since the load is suspended from the expanding plug and not from the expanded shell, the company says. Auxiliary equipment include adapters for installation of air, water or feeder lines, etc., on the projecting bolt ends and universal angle washers for use to 90 deg of the vertical. Bulletin RB1 available.—*Elreco Corp.,* 2900 *Cormany Ave., Cincinnati* 25, *Ohio.*

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Kennametal — pioneers and world's largest manufacturers of cemented carbide mining tools offer you the benefit of one of the most complete collections of material assembled on the use of cemented carbide tools for cutting and drilling coal and rock. It is data recorded and reported by *Kennametal's experienced mining men* — the men who DEMONSTRATE and service Kennametal tools in the mine as well as sell them.

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This is material specializing on the cemented carbide phase of cutting and drilling. In the main, reported by our nation-wide staff of experienced mining men who handle over 30 completely different cemented carbide tools, available in over 400 different sizes. When you buy — consult a specialist, consult a Kennametal mining representative. For specialized information or service on cemented carbide cutting and drilling — write Kennametal Inc., Latrobe, Pa.

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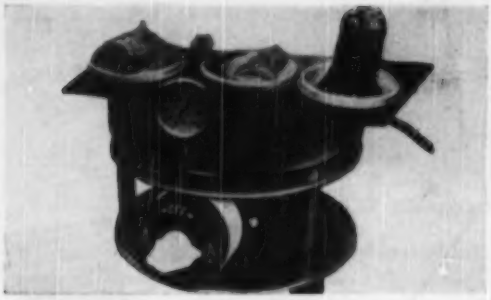
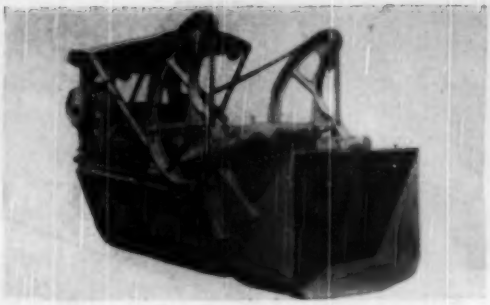


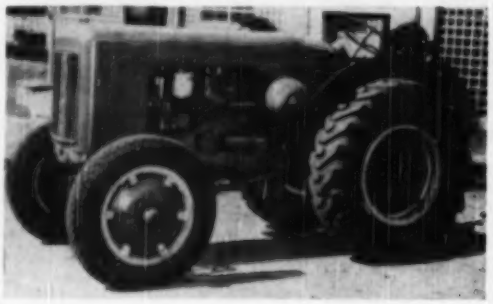
All-Purpose Non-Melting Lubricant

Plastilube, a new all-purpose lubricant said to have no melting point, is adaptable for virtually every automotive and industrial use, possesses greater adhesive qualities, excellent pumpability at low temperatures and does not break down in use, according to the manufacturer. Resistance to heat is shown above by the effect of 345 F on barium grease (left), lithium grease (center) and Plastilube (right), which is unaffected. Since Plastilube does not break down or melt away, it offers a longer service life, the company says. Bulletin available.—*Warren Refining & Chemical Co., 750 Prospect Ave., Cleveland 15.*



Crawler-Mounted Shovel-Loader

New Eimco RockerShovel 104 is powered by either a 48-hp diesel engine or 30-hp electric motor and is designed to dig and load blocky rock or abrasive ores in underground or surface operation. Usable also for bulldozing, the unit loads with a straight backward and forward motion over the cab that eliminates having to turn around to dump. Bucket size ranges from 1¼ yd for heavy-duty rock loading to 2 yd for gravel handling, and loading capacities are rated from 4 to 6 yd per min, according to the manufacturer. Bulletin L1019 available.—*Eimco Corp., 634 S. Fourth West St., Salt Lake City 8, Utah.*

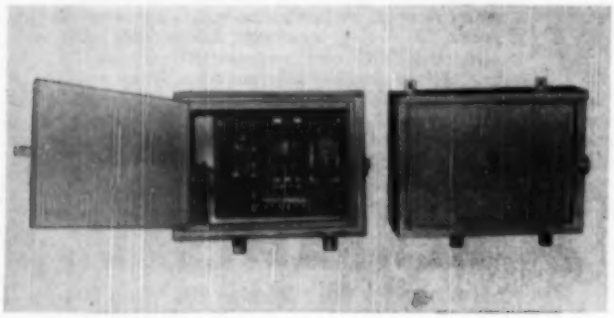


Rubber-Tired Tractor-Compressor

New Schramm Pneumatractor is a tractor-compressor combination powered by either the standard Model 60 Unistage or Model 105 Pneumapower compressor. Especially engineered matching equipment available to permit varied operations includes front-end loader, backfill blade, snow plow, front and rear winches, mower, rotary brush, one-man-operated posthole digger and the Pneumajack, a 45-lb. air-fed drill. Bulletin NEU-50 available.—*Schramm, Inc., West Chester, Pa.*

Jeep Fire Truck

Model 340-J Ansul jeep fire truck carries a 300-lb tank of dry chemical for combating large fires and two Ansul 20 extinguishers mounted on the hood for small fires. The four-wheel Universal jeep has six forward speeds up to 60 mph, and two reverse speeds. All fire-equipment controls may be operated from the driver's seat and the tank may be pressurized on the move. The jeeps are available with either one or two 50-ft hose lines housed in a steel cabinet.—*Ansul Chemical Co., Marinette, Wis.*



Belt-Conveyor Safety Control

New Ensigneer safety control for stopping and starting conveyors at any point along the belt line is operated by pressing together two bare wires strung alongside the belt. Contact between the wires alternately stops or starts the conveyor and the circuit includes a time delay. The unit employs three different relays and must always be used in conjunction with a magnetic starter. Two dry cells in the enclosure provide 1½ v for the control wires and the system is available for either ac- or dc-motor control. The dust-tight and drip-proof enclosure is 15½x11½x16½ in. Bulletin 1125 available.—*Ensign Electric & Mfg. Co., Huntington, W. Va.*

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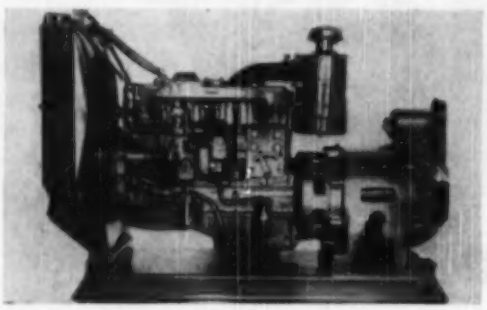
Self-Contained Portable Grease Gun

Rubber-tired, self-contained, battery-operated greasing unit holds 25 lb of grease of any weight for application under pressures ranging from 500 to 12,000 psi and regulated by thumbscrew control. A metering hand nozzle available permits single applications of varying amounts of grease and any standard hand nozzle can be used. A built-in charger reportedly recharges the 6-v battery in 24 hr and the unit is said to grease about 5,000 fittings, or the equivalent of 125 trailer trucks, between chargings. The unit is 23 in high, 27½ in long and, fully loaded, weighs 230 lb.—*Brown Grease Gun Co., 4041 Thrift Rd., Charlotte, N. C.*

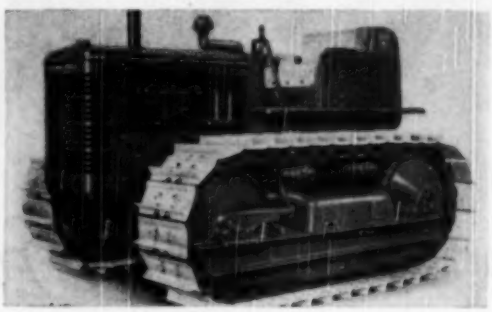
Side-Dump Truck Body

New Easton side-dump truck body features hydraulic dumping and a fully automatic down-folding side gate controlled by a new leverage system with an enclosed protected door-opening mechanism. The gate opens flush with the floor as the body is raised for dumping, with the load chuted clear of the tires, and closes automatically as the body is lowered. The 16-ton Model BD-1116H illustrated here on an Autocar diesel chassis reportedly is especially designed for handling shovel-loaded earth. Other units in larger capacities and also in heavier construction for handling rock and ore are available.—*Easton Car & Construction Co., Easton, Pa.*



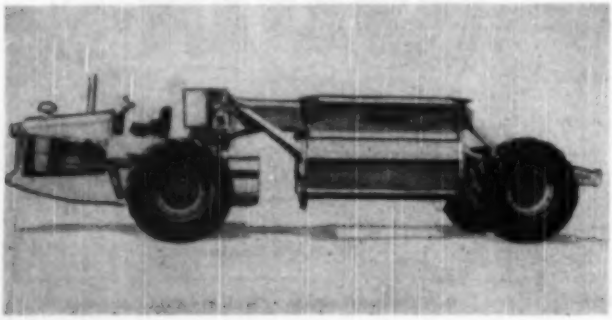
Electric-Generator Sets

New standard line of Cummins diesel-powered electric generator sets includes 60-cycle units available in 40-, 50-, 60-, 75-, 100-, 200- and 250-kw ratings and similar units for 50-cycle operation at a slight derating in kilowatt capacity. They are designed for continuous-service applications as a primary source of power but feature instant-starting and high-availability characteristics that also make them excellent standby or emergency units, the manufacturer reports. The units consist of an engine direct-connected to a single-bearing generator, on a common base.—*Cummins Engine Co., Inc., Columbus, Ind.*



Increased Tractor Power

Higher power-performance ratings for the International TD-9 diesel crawler tractor result from new design improvements in the "9" Series four-cylinder engine that now provides 51.5 hp at the flywheel and 40.5 drawbar hp, the company says. Greater engine power has been obtained through a redesigned combustion system featuring new pistons, an improved precombustion chamber, simplified injection nozzles, the new "A" model IH fuel pump and the new higher compression ratio of 15.7:1, it is reported. Bulletin A-351-NN available.—*International Harvester Co., 180 N. Michigan Ave., Chicago 1.*



Bottom-Dump Hauler

Model E-16 Tournahopper is powered by the C Roadster Tournapull prime mover available with a choice of three engines, the GM-6-71, Cummins HRB-600 or the Buda 6-DC-844. The unit has a heaped capacity of 16 tons, or 15 cu yd, and features self-cleaning doors opening in a manner similar to a clamshell and operated by positive electric control that permits either rapid or controlled ejection. Maneuverability is facilitated by a minimum turning radius of 14 ft, multiple-disk air brakes on all four wheels, positive electric-power steer and speeds from 3.37 to 34.61 mph, it is said. —*R. G. LeTourneau, Inc., Peoria, Ill.*

FOUR MILLION TONS OF COAL CRUSHED

with a parts replacement cost of only $.0005 per ton

AMERICAN AC3-E CRUSHER
in continuous service for 10 years
reduces 300 TPH 6" x 1¼" washed coal to 100% passing 1¼" screen

AT THE LITTLE SISTER COAL CORPORATION (St. David, Ill.)

. . . this crusher is giving a performance that is typically American—*typical* because American Crushers are engineered to "take it," and are *tested in actual use*. They slash power and labor costs too, and cut out-of-service time to a minimum. *Here are a few construction "whys" behind American records*—

THE HEAT TREATED ALLOY STEEL MAIN ROTOR SHAFT—revolves on heavy duty Timken Bearings enclosed in dust and oil-tight pillow blocks. *Perfect balance eliminates vibration.*

THE HEAVY RIBBED SECTIONAL FRAME—Cast Steel—permits *accessibility* and *adjustability* . . . bearing pedestals are cast integral with side frames to assure rigidity.

THE ALL-MANGANESE STEEL CRUSHING PARTS include renewable Breaker and Grinding Plate, also Crushing Chamber cheek liners. Grinding Plate is adjustable to compensate for long wear.

REVERSIBLE SHREDDER RINGS
In reducing coal by *controlled cleavage* (instead of by crushing), these 20-edge manganese steel rings give uniform, high tonnage reduction, with a minimum of degradation, operating at slow (275 to 350 RPM) power-saving speeds.

Let an American representative analyze your crushing problem. Also, we'll be happy to send you our bulletin, "Crushing Coal at Less Than One Cent Per Ton."

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Originators and Manufacturers of Ring Crushers and Pulverizers

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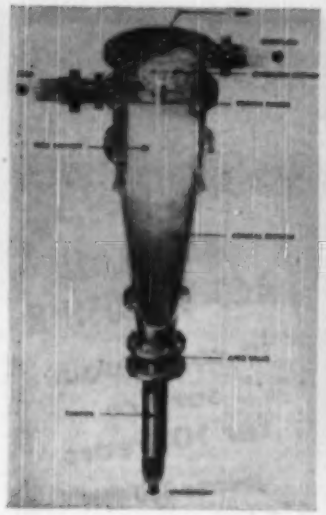
EQUIPMENT PUBLICATIONS



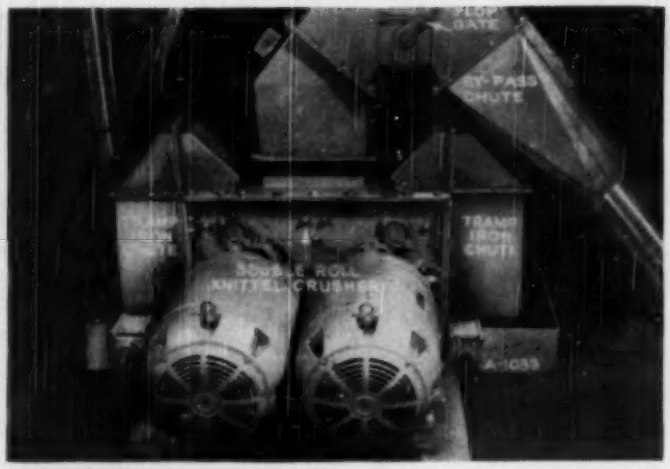
Classifying System

The DorrClone and DorrClone System, the exclusive world rights to which have been acquired by The Dorr Co. in all fields other than heavy-media operations, is a new method of separating or classifying finely divided solids suspended in a liquid. Developed by the Dutch State Mines in Holland for use in their coal-washing plants, it was previously termed the DSM Cyclone. In the DorrClone, a compact cylindroconical classification unit that utilizes centrifugal force instead of gravity, the relatively coarse fractions of the feed pulp are discharged through the tailpipe as an underflow product, while the relatively fine fractions go up and out through the vortex finder as an overflow product.

The units are available in 3-, 6-, 12- and 24-in sizes, with operating pressures varying from 5 to 100 psi, the higher pressures being associated with the finer separations and vice versa. The flow for these sizes ranges from 5 to 600 gpm per unit. Among the features of the DorrClone cited by the manufacturer are the low installed costs and low floor-space requirements, as well as the ability to make separations in the micron range on flocculent pulps without dispersing agents or excessive dilution and production of a cleaner coarse underflow than comparable equipment. Its use is recommended by the company for deslimming, dewatering, classifying and thickening.—*The Dorr Co., Barry Place, Stamford, Conn.*

Automatic Trolley Signal

New automatic signal is actuated by contact with the trolley wheel to show a red light as a locomotive enters an entry, and a green light when the area is clear. The unit is attached to the roof with hanger bolts, the notch in the paddle fitting over the trolley wire. Two mercury tubes operated by the trolley wheel switch the lights on and off. Bulletin available.—*Roxbury Machine Shop, Inc., Rear 1311 Franklin St., Johnstown, Pa.*

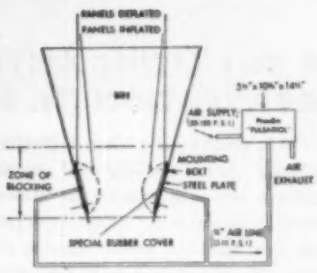


Wet-Coal Crusher

New Stephens-Adamson double-rotor Knittel crusher will effectively handle many materials which tend to clog and reduce crusher capacity, offering the same horsepower-per-ton ratio with wet coal as achieved with dry coal with the standard Knittel crusher, according to the manufacturer. The unit is equipped with two rotors driven by separate direct-coupled motors requiring no synchronization since the crushing sectors operate independently, first splitting the coal on initial impact and then crushing it on the breaker plates. Sized slots in the crusher grate bars determine maximum size of material, with large feed openings and use of only two gangs of sectors permitting handling of maximum-size lumps. Triangular sectors held only by centrifugal force are free to adjust position on impact with tramp iron or other foreign material, with hinged fingers permitting ejection without damage to crusher, it is said. Bulletin 350 available.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Improved Bin Feeding

A new solution to the problem of feeding stubborn materials through bins and hoppers reportedly is provided by pulsating PneuBin panels mounted on the inside walls of bins or hoppers to keep materials moving by positive displacement, thus preventing arching, funneling and tunneling. Flexible covers for the panels are made of reinforced abrasion-resistant Goodrich Armorite rubber, with air flow to and from the panels automatically regulated by the PneuBin "Pulsatrol" unit, said to permit selection of a wide range of pulsation frequency, force and amplitude.—*Gerotor May Corp., Dept. E, Baltimore 3, Md.*



Air Compressor

A new idea in air-compressor design has been incorporated in a new line of modern packaged-type heavy-duty electric-driven compressors, according to the manufacturer, Ingersoll-Rand. Sizes range from 125 to 350 hp for continuous full-load service and two-stage compression of 80- to 125-psi discharge pressures. Designated as the XLE, this completely new L design embodies a single vertical low-pressure compressor cylinder, a horizontal high-pressure cylinder and

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A new booklet entitled "Coal Mining Machinery Lubrication" is full of cost-cutting information on mine lubrication. A copy is available for you now — no obligation. Use the handy coupon below.

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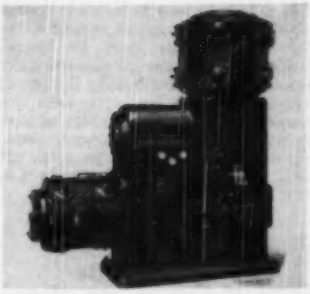
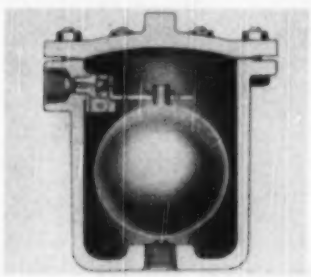


a synchronous motor mounted directly on the crankshaft. It reportedly requires only a very small foundation and offers high efficiency and operating economy, as well as ready movability and low-cost installation. Among the innovations cited by the manufacturer is the "Pipeless Thru-Frame Air Flow." Air enters and leaves the compressor through main air connections on the frame, instead of on cylinders, and is led to and from both cylinders and intercooler through large passages within the frame itself. There is no interstage piping nor cylinder strain from the air piping. The intercooler is of a packaged design requiring only one-fourth the space of conventional coolers, fitting entirely within the same frame. Bulletin 3150 available.—*Ingersoll-Rand Co.*, 11 *Broadway, New York* 4.

Conveyor Pulleys

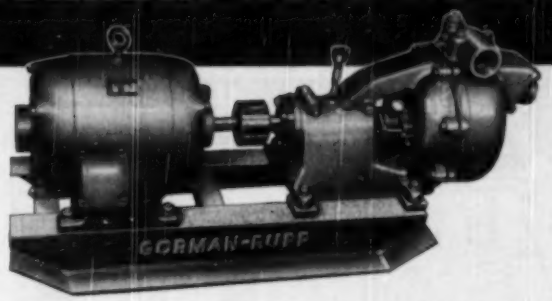
A new line of heavy-duty conveyor pulleys, specifically designed to handle the heavy loads and difficult service conditions of mines and quarries, are said by the manufacturer to be twice as strong as conventional welded-steel designs while weighing no more. Flexible alloy-steel and disks, welded to all-steel hubs, help provide the ability to withstand shaft deflections caused by high belt tensions and heavy loads, the company states.—*American Pulley Co.*, 4200 *Wissahickon Ave., Philadelphia* 29.



Vent and Drain Valve

Use of a simplified ball-type seating mechanism on the Crane automatic vent and drain valve reportedly assures more accurate seating and longer

LOW HEADROOM?
Simply Specify
GORMAN-RUPP PUMPS



A LOT OF PUMP IN A SMALL SPACE

These husky, self-priming, centrifugal mine gathering pumps will handle large quantities of water yet take unbelievably small headroom – from 13½" to 21¼", depending upon size. (pump only)

Ideal for remote locations and automatic operation – requiring little or no attention, operating 24 hours a day, continuously, day after day without shut-down.

Positive and powerful self-priming. No adjustments required between prime and run – start the motor and you start the water.

Sand, muck or solids that will pass the intake strainer WILL NOT CLOG or harm a Gorman-Rupp.

Absolute Simplicity – only one moving part, the impeller – no reduction gears or valves. All wearing parts can be quickly replaced by an inexperienced man with common tools.

You can't beat a Gorman-Rupp for dependability and performance. Available in capacities from 50 to 200 GPM and heads up to 125 feet. Write today for special mine bulletin showing some interesting actual installations, or contact your nearest distributor.

Check **THIS LIST FOR YOUR NEAREST GORMAN-RUPP DISTRIBUTOR**

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Hoe Supply Co., Christopher, Ill.
Central Supply Co., Greenville, Ky.
Ebbert & Kirkman Co. Inc., Birmingham, Ala.
Union Supply Co., Denver, Colorado
Mill & Mine Supply Co., Birmingham, Ala.
Auto Machine Co., Marion, Ill.
Athens Armature & Machine Co., Athens, O.
Bluefield Supply Co., Bluefield, W. Va.
Buckeye Machine Supply Co., New Philadelphia, O.
Cambridge Machine & Supply Co., Cambridge, O.
Central Mine Supply Co., Mt. Vernon, Ill.
General Machinery Co., Birmingham, Alabama
Mine Service Company, Lothair, Ky.
Reliable Electric & Equipment Co., Zanesville, O.
Sackett Electric Corp., Columbus, O.
Superior Sterling Co., Bluefield, W. Va.
Medico Electric Motor Co., Pittston, Pa.
Jackson Implement Co., Jackson, O.
Johns Equipment Co., Ft. Wayne, Indiana
Greenville Supply Co., Greenville, Ky.
Tennessee Mill & Mine Supply Co., Knoxville, Tennessee
West Virginia Pump & Supply Co., Huntington, W. Va.

THE GORMAN-RUPP COMPANY
305 BOWMAN STREET, MANSFIELD, OHIO

For Maximum Safety, Dependability

in Mine Roof Support

always specify

DUFF-NORTON

MINE ROOF JACKS

Duff-Norton Mine Roof Jacks . . . jack fittings . . . angle jacks and pin timbering jacks are your best choice for all mine roof supporting jobs. Their sturdy construction combines safety and dependability with economy. To specify the *right jacks* for your needs . . .

Write today for your copy of this Handy Guide for selecting all types of Mine Jacks.

See your Local Distributor

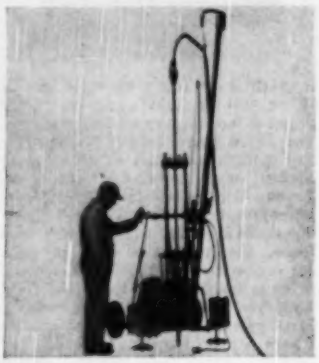
DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA. — CANADIAN PLANT, TORONTO, ONT.

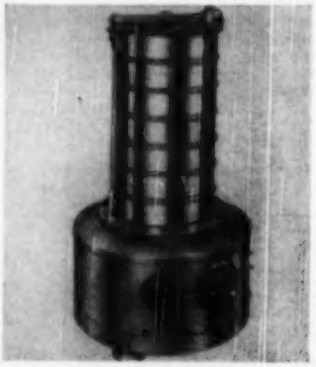
"The House that Jacks Built"

life. Said to be easy to install in water- or oil-piping systems to remove air or in compressed-air lines to remove water and oil, the valve operates automatically, with the cycle of filling and emptying repeating with each accumulation. A complete range of sizes is available for all air requirements up to 150 psi and for water up to 125 psi. Bulletin available.—*Crane Co., 836 S. Michigan Ave., Chicago 5.*



Prospecting Drill

An attachment for the Hossfeld rock drill to permit its adaptation to prospecting, pumps water through the drill and recovers the cuttings so that samples may be taken at any interval. Powered by a gas engine, the unit will drill holes from 1¾ to 2¾ in. in diameter and up to 70 ft in depth. Hole diameter is the same for the full depth, it is stated. The drill can be conveniently transported behind a car or truck or hauled in a ½-ton pickup. The pneumatic wheels facilitate movement from hole to hole.—*Hossfeld Mfg. Co., Winona, Minn.*



Test-Sieve Shakers

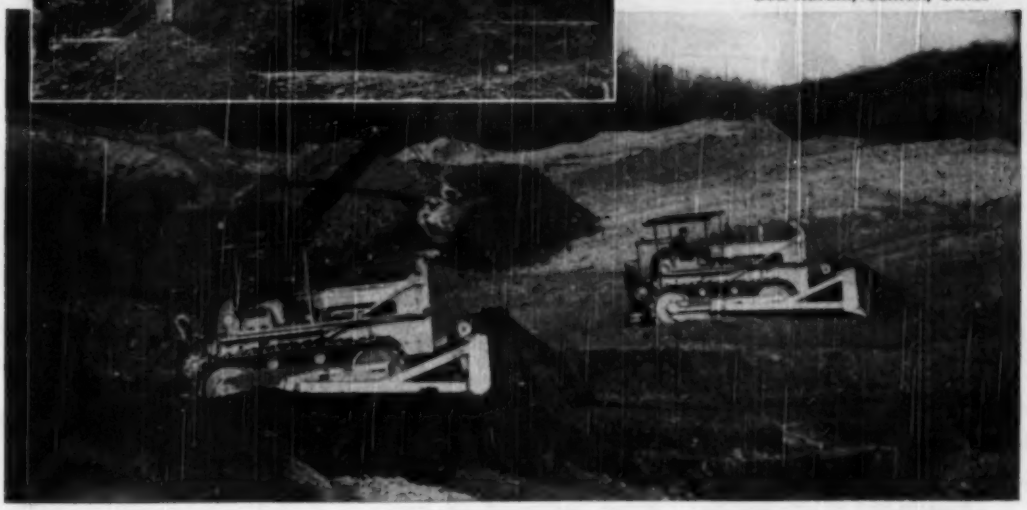
New vibrating small-size test-sieve shaker for laboratory screen analysis features a vibrating action produced by the Syntron patented electromagnet drive energized by rectified half-wave ac current at 3,600 vibrations

A Pair of Champions

DIG IN AND DELIVER

"This Combination Really Moves Dirt."

—Bob Rardin, Canton, Ohio.



Owner Bob Rardin tells this tale of TD-24 performance on his strip mining job near Canton, Ohio.

"It's easy to keep ahead of the loading shovel. With 35 feet of overburden to shove 75 yards, we can even gain a little. The TD-24's work right along on slopes so steep that we have to cut them down before other tractors can even navigate them unloaded. They are fast tractors, easy to shift, and they have plenty of 'steam'. This combination really moves dirt."

No wonder everybody calls the TD-24 the "Champion of Crawlers." No other crawler can come close to TD-24 performance on the job.

Mr. Rardin says, "All the Internationals we have owned have made us more money than any other tractors could. Service has always been good and parts delivered promptly when needed."

Why wait and wonder what the TD-24 can do for you? See it and try it yourself. Visit your International Industrial Power Distributor—the first step toward getting the "Champion of Crawlers" to work for you.

INTERNATIONAL HARVESTER COMPANY • Chicago

Tune in James Melton and "Harvest of Stars"—NBC, Sunday afternoons

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL HARVESTER

INTERNATIONAL INDUSTRIAL POWER

here's your new Clevis Hook Team

A LAUGHLIN EXCLUSIVE THAT PAYS OFF DOUBLE!

A success from the very start, the Laughlin Clevis Grab Hook has proved so popular that users in many fields have asked us: "Why not a slip hook with the same clevis advantages?" We agreed and it's available for the first time.

Like the Grab Hook, the new Slip Hook is easily attached to any welded chain — no connecting fitting needed, and no cutting, bending or rewelding. *You just slip the pin through the clevis and chain, spread the cotter—and that's all!*

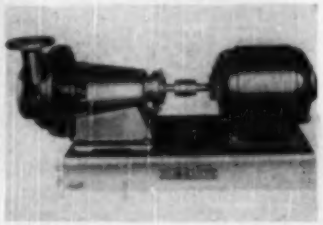
Rugged, heat-treated and drop-forged. Stronger than ordinary hooks — and safer. Forged cotter-housings protect workers' hands.

Separately, these exclusive Laughlin fittings are tops in their own particular jobs. Together, they form a team that can't be equalled for cost-cutting efficiency. Put them to work for you, saving time, labor and money! . . . Write for Laughlin's Catalog 145, data book of the industry. THE THOMAS LAUGHLIN COMPANY, DEPT. 6, PORTLAND 6, MAINE.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

per min from 60 cycle. There are no bearings, gears, belts or pulleys, etc., to maintain and replace and no lubrication is required, it is said. Amplitude of vibration is regulated by a readily accessible rheostat, and a reset timer reportedly provides accurately timed test periods. The unit handles six 8-in sieves and operates on 110-v ac. Bulletin available. —*Syntron Co., 975 Lexington, Homer City, Pa.*



Process Pumps

DeLaval Type CP pumps are especially designed for general-service applications requiring handling of hot or cold clear liquids, viscous liquids, corrosive liquids or liquids carrying suspended solids. They are furnished with open or closed impellers, mechanical seals or conventional packing. Vane characteristics and materials of construction can be selected to suit requirements. Features cited by the manufacturer include axial adjustment of rotor to compensate for wear at impeller face, quick conversion to or from open and closed impeller and conventional packing and mechanical seal, permanently lubricated bearings and standardized parts. Bulletin 1125 available. — *DeLaval Steam Turbine Co., Trenton 2, N. J.*

Improved Coupling

Recently redesigned Falk Airflex coupling offers improvements in rubber composition and bonding that reportedly have increased the torque capacity 20% above previous values, plus new hubs and adaptor plates facilitating disconnection and removal of the entire gland assembly. New components are interchangeable with Airflex couplings now in use and standard parts may be combined to permit six different mounting arrangements. The coupling is designed primarily for engine drives and for applications involving extremely severe torque fluctuations. Bulletins 8100 and 8105 available.—*Falk Corp., Milwaukee 8, Wis.*

FIRTHITE MINING TOOLS

bring Greater Tonnages with Lower Power Consumption

You can do it...

Better- designed to eliminate movement in the chain, and the resulting destruction in service. Tougher, harder carbide for keener cuts and longer life.

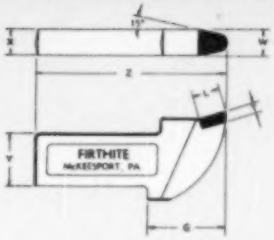
Faster- engineered for fast, clean free cutting. Forged shanks held to close tolerances for quick, secure fitting into chain—self-gaging—faster bit changing.

Cheaper- lower bit costs per ton of clean coal (even less than .2 cent per ton) as much as 50% less power than required for steel bits.

with *Firth Sterling* FIRTHITE BITS

MACHINE CUTTER BITS

Styles C-1, C-4, C-7, C-8, H and L



Designed for use in any standard machine cutter chains having ⅛" x 1" bit holders.

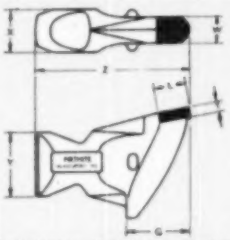
Style No.	Shank Size				Tip Size		
	G	X	Y	Z	L	W	T
C-1-H	1½	½	1	3⅝	⅝	½	⅝
C-4-H	1⅝	⅝	1	4	⅝	½	⅝
C-1-L	1½	½	1	3⅝	⅝	½	⅝
C-4-L	1⅝	⅝	1	4	⅝	½	⅝
C-7	1⅝	⅝	1	4	⅝	½	⅝
C-8	1½	½	1	3⅝	⅝	½	⅝

DIMENSIONS IN INCHES

For Prices See Catalog Secection 90-010. Pages 1 & 2

MACHINE CUTTER BITS

Styles C-5 & C-6



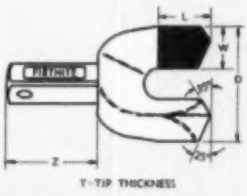
Designed for use in L-6000 cutter chains. No bit holder is required.
Outlasts steel bits by as much as 100 to 1 under average conditions.

Style No.	SHANK SIZE				TIP SIZE		
	G	X	Y	Z	L	W	T
C-5	1⅜	11/16	1⅛	3	⅝	½	5/16
C-6	1½	11/16	1⅛	3⅛	⅝	½	5/16

DIMENSIONS IN INCHES

For Prices see Catalog Section 90-010. Page 3

AUGER DRILL BITS



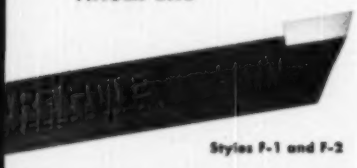
Tipped with Firth Sterling MPD-2, an alloy of tungsten-carbide and cobalt, developed especially for mining machine service.

STYLE No.	SHANK SIZE		TIP SIZE			
	D	Shank Size	Z	L	W	T
D-1 5/8	1 5/8	½	1 5/16	5/8	7/16	5/16
D-1 3/4	1 3/4	½	1 5/16	5/8	7/16	5/16
D-1 7/8	1 7/8	½	1 5/16	5/8	7/16	5/16
D-1 5/8	1 5/8	½	1 5/16	5/8	7/16	5/16
D-1 7/8	1 7/8	½	1 5/16	5/8	7/16	5/16
D-2	2	½	1 5/16	5/8	7/16	5/16
D-2 1/8	2 1/8	½	1 5/16	5/8	7/16	5/16
D-2 1/4	2 1/4	11/16 Hex.	2 1/16	1	7/16	5/16
D-2 1/4	2 1/4	11/16 Hex.	2 1/16	1	7/16	5/16
D-3	3	11/16 Hex.	2 1/16	1	1	5/16

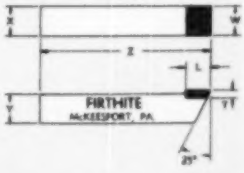
DIMENSIONS IN INCHES

For Prices see Catalog Section 90-030. Pages 1 & 2

FINGER BITS



Styles F-1 and F-2



Firthite "Finger" Bits are especially designed for use in standard molefoot drilling heads. Reduce bit costs as much as 25% to 40%.

Style No.	Shank Size			Tip Size		
	X	Y	Z	L	W	T
F-1	½	½	2¾	½	½	½
F-2	½	½	3	½	½	½
F-3	⅝	⅝	2⅝	⅝	⅝	½
F-4	⅝	⅝	3	⅝	⅝	½

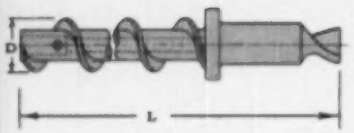
DIMENSIONS IN INCHES

For Prices see Catalog Section 90-030. Page 1

TEAR OUT AND TACK ON WALL

Firth Sterling MINING TOOLS

Do the Job Better-Faster-Cheaper

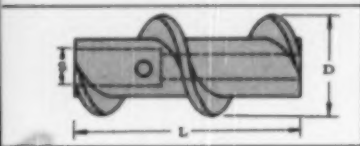


TWISTED SHANK AUGERS

Firth Sterling Twisted Shank Augers are designed for post or machine—mounted drilling or for hand-held drilling. Made of high nickel alloy steel. Scroll and shaft are flame hardened after fabrication for strength and long life.

SIZES Std. Auger Lgths. "L"	1 5/16" Dia. D 5/8" Hole Style No.	1 5/8" Dia. D 3/4" Hole Style No.	2" Dia. D 1" Hole Style No.
3 ft.	TS-24-3	TS-28-3	TS-32-3
4 ft.	TS-24-4	TS-28-4	TS-32-4
5 ft.	TS-24-5	TS-28-5	TS-32-5
6 ft.	TS-24-6	TS-28-6	TS-32-6
7 ft.	TS-24-7	TS-28-7	TS-32-7
8 ft.	TS-24-8	TS-28-8	TS-32-8
9 ft.	TS-24-9	TS-28-9	TS-32-9
Drill Bits to Fit Augers	D-1 5/8	D-2	D-2 1/8

Other Standard styles of shanks may be furnished on order. For Prices see Catalog Section 90-050. Page 1

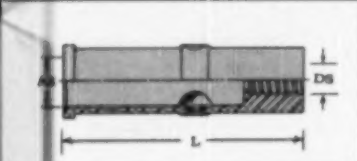


AUGER ADAPTERS

Made of same heavy-walled seamless nickel-alloy steel as are Firth Sterling Augers. To make the auger bit-socket accommodate larger or smaller bit shanks, three different size auger adapters are available.

DIMENSIONS			
STYLE	L	D	S
AA-6	4	1 5/16	1/2
AA-7	4	1 3/4	5/8
AA-8	4	2	3/4

For Prices see Catalog Section 90-051. Page 1



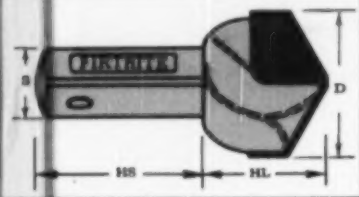
AUGER DRIVE SOCKETS

Strong and durable—made to withstand the severe abuse they encounter in service. Threaded socket fits conventional 1" thread hand drill shaft.

DIMENSIONS			
STYLE	DS	L	AS
R-16 Rivet T-17 Thread	1 5/16" 1"-8 USSV thd.	8" 6 3/4"	1 5/16" 1 5/16"

For Prices see Catalog Section 90-051. Page 1

TEAR OUT AND TACK ON WALL

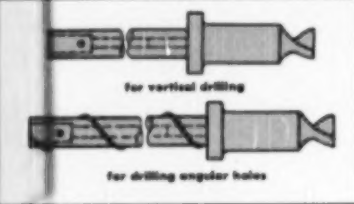


FIRTHITE ROOF BOLTING ROTARY DRILL BITS

Developed expressly for drilling holes for roof bolting, trolley hangers, pin holes, etc. Best suited for drilling where rock conditions do not require percussion tools for drilling.

SIZES	In Inches			
Style	D	S	HL	HS
RD-1 1/16	1 1/16	1/2	1 5/16	1 5/16
RD-1 1/8	1 1/8	5/8	1 5/16	1 5/16
RD-1 5/8	1 5/8	1/2	1 5/16	1 5/16
RD-1 1/2	1 1/2	1/2	1 5/16	1 5/16

For Prices see Catalog Section 90-020. Page 3



AUGER DRILL BIT DRIVERS

For use with styles D & DR Styles of Drill bits commonly used for roof bolting

Made of nickel alloy steel rolled into seamless tubing with heavy-duty wall thickness —hot forged and heat treated to resist wear and breakage.

SIZES Std. Auger Lengths	BEADED SCROLL Style Number	NO SCROLL Style Number
1 ft.	RAS-1	RA-1
2 ft.	RAS 2	RA-2
3 ft.	RAS-3	RA-3
4 ft.	RAS-4	RA-4
5 ft.	RAS-5	RA-5
6 ft.	RAS-6	RA-6
7 ft.	RAS-7	RA-7
8 ft.	RAS 8	RA-8
9 ft.	RAS-9	RA-9

For Prices see Catalog Section 90-030. Page 2

4-POINT PERCUSSION BITS

Developed expressly for the drilling of extremely abrasive rocks, such as encountered in coal mine roof bolting.

DIMENSIONS IN INCHES							
STYLE	Thr'd	A	D	Z	L	W	T
PD-A-1 1/4	7/8	1 1/16	1 1/4	1 11/16	1/2	1/2	5/8
PD-A-1 5/8	7/8	1 1/16	1 5/8	1 11/16	1/2	5/8	5/8
PD-F-1 5/8	7/8	1 1/16	1 5/8	1 11/16	1/2	3/4	5/8

For Prices see Catalog Section 90-040. Page 1

5-191

Available from Stock near your Mine...

Amos A. Culp	930 Second Ave., North	Birmingham 4, Ala.
Atlas Supply & Equipment Co.	305 North Fourth St.	Clarksburg, W. Va.
Diamond Supply Company, Inc.	616-24 N. W. Second St.	Evansville, Indiana
Dunlap Welding & Supply Co.		Zanesville, Ohio
Persingers, Inc.		Charleston, W. Va.
Persingers Supply Company		Williamson, W. Va.
Quaker Sales Corp.	83 Cooper Ave.	Johnstown, Pa.
Union Supply Company	1920 Market St.	Denver 2, Colorado

Firth Sterling STEEL & CARBIDE CORPORATION

McKEESPORT, PA.

"Quick delivery"... that's only one of the things we mean by Service Plus!

U·S·S HIGH STRENGTH STEELS
The steels that do more

COR-TEN · MAN-TEN · ABRASION-RESISTING
MANGANESE-NICKEL-COPPER
HOT ROLLED AND COLD
FINISHED BARS · PLATES · FLOOR PLATE
STRUCTURALS · SHEETS · STRIP · STAINLESS
ALLOY STEELS · ALUMINUM · TOOLS
SUPPLIES · MACHINERY

● Customers tell us that "Quick delivery" and "United States Steel Supply Company" mean the same thing to them. When emergency repairs had to be made or a deadline had to be met, they tested our service and found our "*quick delivery*" usually surpassed their most exacting demands. And in regard to ordinary deliveries, many customers, in a recent survey, wrote "I like your promptness."

"Service Plus" promises you more than speed, however. It is our reminder that we maintain a complete range of steel products, that requests for special products receive special attention, that every order, large or small, gets fast action from experienced personnel, and that you receive courteous, as well as prompt treatment—always.

WHEN YOU DEAL WITH US, YOU GET Service Plus!

UNITED STATES STEEL SUPPLY COMPANY

USS

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UNITED STATES STEEL

Even on the toughest piping jobs VICTAULIC Couplings, Victaulic Full-Flow Elbows, Tees and other Fittings will make joining those pipe ends quick, easy, and economical – assure you a leak-tight piping job!

You save every way when you *join up* with "Vic"– a simple two-bolt design gives quick, easy hookups, a standard T-Wrench is the only tool needed for connections . . . joints are positive-locked, leak-proof, will stand up under extreme pressure, vacuum, or strain conditions.

GROOVING THOSE PIPE ENDS is a cinch the Victaulic Way . . . "Vic-Groover" grooves 'em automatically in half the time of a conventional pipe threader!

The COMPLETE Victaulic Line *can't be beat* for efficient, dependable, on-the-job piping construction. Yes Sir! Victaulic IS the Easiest Way to Make Ends Meet. JOIN UP WITH "VIC"– make your next piping job ALL VICTAULIC. Write today for these two:

Victaulic Catalog and Engineering Manual No. 44. "Vic-Groover" Catalog No. VG-47.

VICTAULIC COMPANY OF AMERICA
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For Export outside U.S. & Canada: PIPECO Couplings & Fittings; Pipe Couplings, Inc., 30 Rockefeller Plaza, New York 20, N.Y.

26TH VICTAULIC YEAR

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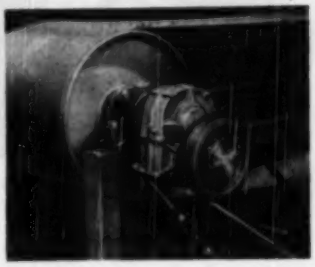
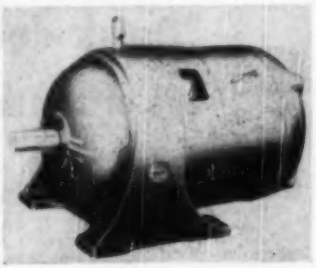
The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

Sorry, Photos Switched!

It doesn't happen often, but The Editors sincerely apologize to readers, as well as to the manufacturers, for any inconvenience caused by the inadvertent switching of the photos accompanying the descriptions of the Dodge Torque-Arm speed reducer (p 128) and the Foote Bros.-Louis Allis gearmotor (p 130) in our February issue. For the record, here are the photos, correctly identified.



DODGE TORQUE-ARM SPEED REDUCER available in six sizes up to 28.5 hp mounts directly on the driven shaft and is readily installed and switched from machine to machine without special engining. Bulletin A-470 available.—*Dodge Mfg. Co., Mishawaka, Ind.*



FOOTE BROS. - LOUIS ALLIS GEARMOTORS, available in 17 sizes and in a wide selection of enclosures for both ac and dc, provide single-, double- and triple-reduction units with output speeds from 780 down to 7½ rpm and integral horsepower ratings from 1 to 75.—*Either Foote Bros. Gear & Machine Corp., Chicago, or Louis Allis Co., Milwaukee, Wis.*

The Printer Muffed This

By a simple transposition of words, a very important question asked by the American Mine Door Co. in its advertisement describing the Canton track cleaner (p 191, April, *Coal Age*), was given an unintentional humorous twist. It wasn't meant that way, of course, for the Canton track cleaner is designed to effectively handle the very serious and necessary job of keeping track clean at a low cost. The question asked should have been: "By hand, can you clean track at 1½c a foot?"

FASTER DRILLING WITH A STRAIGHT TRUE BORE HOLE

COALMASTER SERIES 0875 AUGERS WITH No. 1046 BITS—THE MATCHED TEAM FOR HAND-HELD DRILLING

Spir-L-Weld Coalmaster Augers provide smooth, fast conveyance—clean holes—reduced strain on equipment and operator.

Coalmaster Drill Bits, of special analysis steel, cut faster, stay sharp longer — reduce costs.

- **Two prong design slashes power consumption**
- **Long life one-piece solid shank**

Coalmaster Matched Sets provide perfect alignment — a better bore hole for tamping and shooting.

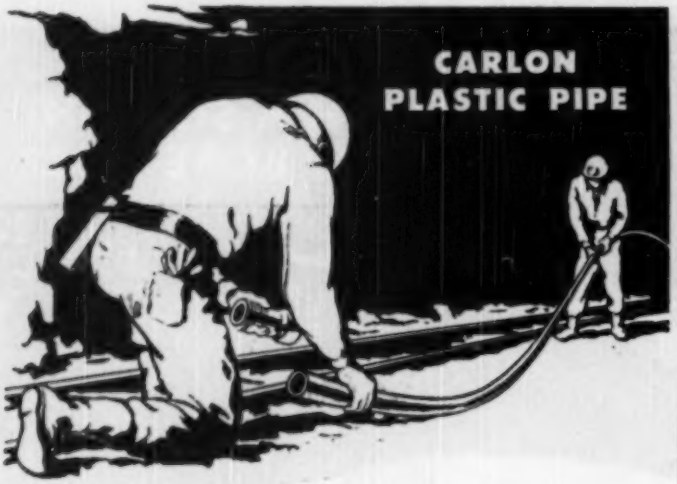
Write for the new Coalmaster Catalog.

Austin Powder Company, Cleveland, Ohio; The Buda Company, Harvey, Illinois; Diamond Supply Company, Inc., Evansville, Indiana; Dooley Brothers, Peoria, Illinois; Drillmaster Supply Co., Evansville, Indiana; Illinois Powder Mfg. Co., St. Louis, Missouri; Salt Lake City, Utah; Joy Manufacturing Company, Main Office Pittsburgh, Pa., Subsidiaries and representatives in 57 countries; Mobile Drilling, Inc., Indianapolis, Ind.; Salem Tool Company, Salem, Ohio.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

ST. LOUIS 15, MO.



Corrosionproof
Light Weight
Flexible...

GUARANTEES LONG CORROSION-FREE SERVICE LIFE UNDER SEVEREST MINE OPERATING CONDITIONS

■ CARLON "E" utilizes the inherent properties of plastics to solve the mining industry's pipe corrosion problems. Extruded from a specially compounded plastic, CARLON "E" pipe withstands the effects of sulphurous water . . . alkalies . . . metallic salts . . . and it has a normal service life many times that of metal piping.

■ Light weight . . . Flexibility . . . Corrosion resistance . . . These remarkable features of plastic pipe will drastically reduce your installation, maintenance, and replacement costs. CARLON "E" curves to follow shaft direction, self-adjusts to uneven surfaces, and requires a minimum number of fittings.

■ Operational tests conducted by some of the country's leading mining companies have proven conclusively that CARLON "E" plastic pipe is easier to install (at lower cost) and that its service life is far greater than that of metallic pipe.

■ Check CARLON "E" specifications. Call upon Carter's engineers or field experts to help you with mine piping problems.

Specifications of CARLON "E" pipe

Standard Pipe Size	O. D.	I. D.	Calculated Bursting Pressure P. S. I.	Weight/ Ft.	Normal Shipping Lengths
1/2"	.840	.622	540 lbs.	0.10 lbs.	400 ft. coils
3/4"	1.050	.824	350 lbs.	0.14 lbs.	400 ft. coils
1"	1.310	1.070	200 lbs.	0.18 lbs.	300 ft. coils
1¼"	1.660	1.380	200 lbs.	0.27 lbs.	300 ft. coils
1½"	1.900	1.610	200 lbs.	0.32 lbs.	250 ft. coils
2"	2.378	2.070	170 lbs.	0.44 lbs.	200 ft. coils
3"	3.504	3.070	165 lbs.	0.91 lbs.	100 ft. coils
4"	4.504	4.030	150 lbs.	1.25 lbs.	25 ft. Str.
6"	6.630	6.070	115 lbs.	2.23 lbs.	25 ft. Str.

CARLON CP *Manufacturers of Extruded Plastics*

CARTER PRODUCTS CORPORATION

10223 MEECH AVENUE — CLEVELAND 5, OHIO

Centralized Lubrication

New master oiler, known as Lincoln CentrOiler, may be installed on any machine now relying on the oil can to lubricate a multiplicity of bearing points and requires no special engineering skill or knowledge for installation. The system consists of the CentrOiler pump and a single-line circuit of SL-4 injectors, which in turn deliver a predetermined measured quantity of oil to each bearing every time the system is cycled. Bulletin 802 available.—*Lincoln Engineering Co., 5729 Natural Bridge Ave., St. Louis 20, Mo.*

Equipment Shorts

MAGNETIC FLOOR SWEEPER— Permanent magnetic device of sweeping or retrieving ferrous material from floors, parking lots, driveways, etc., operates like a carpet sweeper, with a rotating magnetic tube mounted between Neoprene wheels and easily unloaded by pushing the wiper ring from one end of the tube to the other. The unit is available in sizes from about 12 to 36 in. at prices ranging from $26.50 to $106.—*Eriez Mfg. Co., Erie, Pa.*

COAL-TRUCK LOADER — Model 544 heavy-duty pneumatic-tired loader, designed for high flexibility in truck-loading operations, offers a 15-mph road speed to move quickly from one scattered stockpile or storage bin to another. Easily maneuvered, the unit loads trucks from the side, the rear or over the cab, with full control of loading secured by the hydraulically controlled swiveling load-trimming dis-

"These U.S. ROYALS can really stand the gaff!"

says H. H. Barton, Vice-President, Barton Mines, North Creek, N.Y.

"...AND DRIVING OVER THIS GARNET IS A TOUGH TEST FOR ANY TIRE"

"We're mining garnet here and it's tough stuff. Garnet is used as an abrasive, so you can guess what it does to tires. And our trucks are driving over it all day. We've found these U. S. Royal Con-trak-tors can take it all the way."

U. S. ROYAL CON-TRAK-TOR. Just look at all the *extras* built right into this rugged tire:

- **CUT-RESISTING TREAD** with deep cleats gives your trucks 2-way traction.
- **ROUNDED SHOULDERS** improve flotation in soft going.
- **SHOCK PAD CONSTRUCTION** guards against rupture.

U. S. FLEET SERVICE. Your U. S. Royal Distributor is ready to draw up a tailor-made preventive tire maintenance plan designed especially for your operation—a plan which can give you lower cost per tire mile! He'll give you service where it counts—on your job! Call your U. S. Royal Distributor today. He's listed in your Classified Telephone Directory.

U.S. ROYAL TIRES

U. S. ROYALS

Products of UNITED STATES RUBBER COMPANY

charge conveyor. Bulletin 543-4 available.—*Barber-Greene Co., Aurora, Ill.*

FAST-DRYING ALUMINUM PAINT, known as BiChem R, is said to dry to handle in 12 to 18 min, not to "stain" or "yellow" from continued exposure at high temperatures and to offer good resistance to chemical fumes. Samples and bulletin available.—*Bisonite Co., Inc., 128 Lakeview Ave., Buffalo 1, N. Y.*

STUD DRIVER — Positive and easier automatic firing-pin action with no misfires or delays reportedly is obtained with a new feature of the MSA Velocity-Power Driver for driving steel studs into metal, concrete or masonry. The new spring-impelled firing pin is said to virtually eliminate the "human factor" in firing a stud-cartridge unit because the arrangement is positive in action, yet safe and tamper-proof. Studs inserted by the MSA driver are said to have a holding power of several thousand pounds.—*Mine Safety Appliances Co., Pittsburgh 8, Pa.*

HAND HOISTS—New Wright Safeway hand hoists in capacities from ½ to 4 tons are said to offer an unusual degree of safety, efficiency and portability. Compact and permitting close headroom, the units reportedly are lightweight and easy to handle in tight places.—*Wright Hoist Div., American Chain & Cable Corp., York, Pa.*

Equipment Publications

New Bulletins Available Without Charge on Request to the Manufacturer—Arranged for Your Convenience to Permit a Quick Check of Items of Interest—Literature on New Equipment Described on Previous Pages Also Is Normally Available From the Manufacturers.

BRATTICE CLOTH—C. R. Daniels, Inc., Daniels, Md. Folder, "Dandux Better-Made Brattice Cloth," announces and describes features of this product and outlines company's newly expanded facilities for manufacture.

CEMENT—Universal Atlas Cement Co., 723 Chrysler Bldg., New York 17. Booklet, "A Decade of Atlas Duraplastic," traces development of Atlas Duraplastic air-entraining cement to its present use in a wide variety of construction projects and concrete products. Various types of applications are illustrated.

COAL-HANDLING EQUIPMENT—McNally-Pittsburg Mfg. Corp., Pittsburg, Kan. Bulletin 501 covers a wide range of preparation-plant auxiliary equipment and includes information on features and operation of conveyors, drives, elevators, car retarders, pumps, screens and valves, etc.

CONVEYOR BELTING—Carlyle Rubber Co., 64 Park Place, New York 7. Booklet, "Installation, Care and Maintenance of Rubber Conveyor Belting," offers helpful information to users of belting.

CONVEYOR BELTING—Victor Balata & Textile Belting Co., 55 Park Place, New York 7. Bulletin 26 offers performance information and prices on the company's "Supreme" belting, said to be a textile belt that will meet all elevating and conveying requirements in handling practically every type of material.

CONVEYOR MINING — Jeffrey Mfg. Co., Columbus 16, Ohio. Bulletin 820, designed to assist in selecting proper equipment for a complete conveyor-mining set-up, describes and illustrates the complete line of Jeffrey conveyors and parts, shortwall cutters, a rubber-tired loader especially adapted to conveyor mining, drills, blowers, etc. A special section discusses and illustrates conveyor-mining systems in use at mines with varying mining conditions.

DIAPHRAGM PUMP—Dorr Co., Barry Place, Stamford, Conn. Bulletin 8002, "The Dorrco Type W. Pump," describes the newest addition to the Dorr line of diaphragm pumps, said to handle up to 75 cfm of pulp, and to be expressly designed for extra-heavy-duty operations wherever big tonnages, big flows or heavy pulps are involved and especially suitable for handling thickener and Hydroseparator underflows.

DIESEL ENGINES—Cummins Engine Co., Inc., Columbus, Ind. Bulletin 5291 contains complete specifications for all models of HR-400 Cummins diesels, which are 4-cycle engines developing a maximum of 100 hp at 1,800 rpm and available in six models for all types of highway and off-highway automotive applications and a wide range of industrial uses.

ENGINEERING DEVELOPMENTS—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. 1949 Annual Review of engineering developments at Allis-Chalmers discusses trends and progress in the application and development of A-C products in power generation and distribution and for coal and metal mining and varied other industries.

FIRE-EXTINGUISHER INSPECTION—Ansul Chemical Co., Marinette, Wis. Periodic inspection chart is designed to help inspectors keep accurate records of fire extinguishers and provides space for 26 inspections of up to 33 extinguishers, with listings of location, extinguisher number and type, etc.

HAND HOISTS—Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa. Folder DH-144 describes the new line of Wright Safeway hand hoists available in capacities from ½ to 4 tons.

HEAT-TREATED ALLOY STEELS—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80. Bulletin gives engineering data on two high-performance alloy steels supplied in the heat-treated condition ready to use and sold under the trade names of Rycrome and Nikrome "M" as suitable for heavy-duty axles and shafts, gears, pinions, studs, bolts, etc.

HEAVY - MEDIA SEPARATORS, CLASSIFIERS—Hardinge Co., Inc., 240 Arch St., York, Pa. Bulletin 39-B on wet-classification and heavy-media separation devices includes comprehensive flow sheets and typical operating data with details of the following Hardinge equipment: counter-current classifier, counter-current heavy-media separator, heavy-media densifier, hydroclassifier, and hydroseparator.

HOISTS, WINCHES AND CAR SPOTTERS—Atlas Corp., Mountville, Pa. Bulletin 150 illustrates the company's line of Fridy hoists, winches and car spotters, with details of construction, features and capacities.

LUBRICANTS—Lubriplate Div., Fiske Bros. Refining Co., 129 Lockwood St., Newark 5, N. J. Data book 1-50 covers the features, properties and application of Lubriplate lubricants and recommends the best types to be used on various types of mining machinery.

PNEUMATIC AND HYDRAULIC CYLINDERS—Ledeen Mfg. Co., 1600 So. San Pedro St., Los Angeles 15, Calif. Bulletin 500 gives dimensions and weights, ratings and limitations of the recently announced medium-duty line and the Ledeen heavy-duty and superduty lines of pneumatic and hydraulic actuating cylinders.

POWER DISTRIBUTION — Mines Equipment Div., Joy Mfg. Co., Dept. 2, Oliver Bldg., Pittsburgh 22, Pa. Bulletin SCC-102 offers quick information on electrical distribution centers and electrical connectors for mining operations and also includes data on track switches, rotary dryers and cable-vulcanizing equipment.

PROPORTIONING AND BLENDING SYSTEM—Richardson Scale Co., Clifton, N. J. Bulletin 3849 describes the Convoyometer, a self-testing feeder-weigher designed for proportioning any number of materials in a continuous process of mixing and blending and also for delivering and recording a prescribed tonnage of material by weight.

PULLEYS — Sprout-Waldron & Co., Inc., Muncy, Pa. Bulletin 33 discusses the complete line of Sprout-Waldron "Blue-Face" pulleys, with specifications and prices. Bulletin 35 describes the use of the exclusive Sprout-Waldron "Belt-Saver" tail pulley, which features a cone and wing design said to cast aside hard abrasive materials that often lodge between the belt and flat face of the conventional type pulley.

VIBRATORY FEEDERS — Syntron Co., 975 Lexington, Homer City, Pa. Bulletin illustrates and describes construction and application of Syntron line of "Vibra-Flow" vibratory feeders, available in various types to meet a wide range of installation requirements. Separate bulletin available includes details and specifications for the company's line of concrete vibrators.

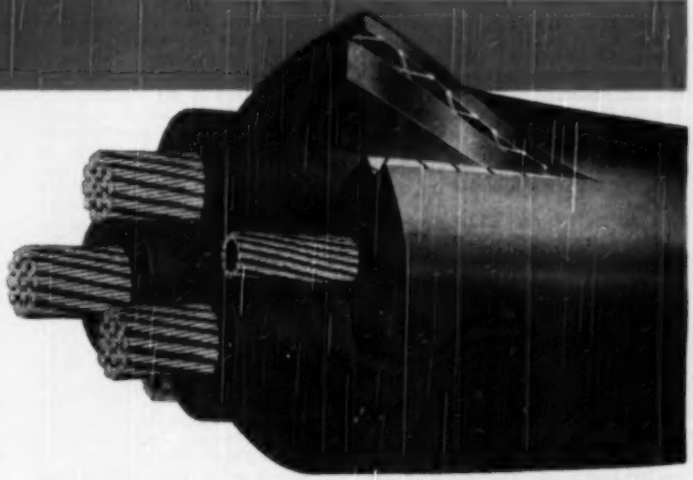
WHEEL TRACTORS—Oliver Corp., Industrial Div., 19300 Euclid Ave., Cleveland 17, Ohio. Bulletin A-918 covers the complete Oliver line of wheel tractors and includes specifications and detailed data, along with information on the matched allied equipment available.

WIRE CLOTH—Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J. Catalog D covers the company's entire line of woven-wire screen and wire-cloth products. It discusses manufacturing and engineering facilities and provides complete specifications, prices and illustrations of the various types, along with engineering data of help to users.

WOOD PRESERVATIVE—Dow Chemical Co., Midland, Mich. Bulletin covers company's recommendations for buying wood treated with formulations of pentachlorophenol (Penta) to resist the attack of decay, fungi, wood-destroying insects and dimensional changes caused by excessive moisture or lack of moisture. The guide covers wood treated by pressure treatment, hot and cold immersion, Dri-Vac, cold soaking, and dipping.

NOW! First mine cable insulated with COLD RUBBER

Another big improvement in Securityflex 600-V Mine Cable



*Cold rubber is firmer and tougher and less permeable. It gives this new and better Type G Securityflex**

much more moisture resistance
much more compression resistance
much more cut resistance

That means longer cable life, fewer power interruptions, less maintenance trouble, *much more value for your money.*

Also—the famous Anaconda patented rubber-cored grounding wires are non-kinking and cushioned in a larger diameter that won't cut insulation.

This means far more dependable and efficient grounding. When the cable twists in service the grounding wires are protected. Every wire in every strand is firmly supported and cushioned. There'll be fewer failures, fewer splices, less production loss, less expense.

Investigate this cable. See it. Call your nearest Anaconda Sales Office or Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Reg. U. S. Pat. Off.

the right cable for the job ANACONDA® WIRE AND CABLE

Among the Manufacturers

Walter A. Huber has been appointed general manager, Wire Rope Div., John A. Roebling's Sons Co., Trenton, N. J. The appointment, according to Charles R. Tyson, Roebling president, is part of a plan to decentralize the company's various divisions and specialize each product division for more production efficiency and better service to customers. For the past 9 yr, Mr. Huber served as manager of preformed wire rope sales for the American Chain & Cable Co., Inc., and has been secretary of the Wire Rope Institute for the past 10 yr.

Robert H. Morse Jr. has been elected president, Fairbanks, Morse & Co., Chicago, succeeding his father, Col. Robert H. Morse, who becomes chairman of the board. Mr. Morse, with the company since 1916, formerly was vice president in charge of operations, previously serving as vice president in charge of sales and assistant general sales manager. His grandfather, Charles Hosmer Morse, was the founder of the company and was chairman of the board upon his death in 1921. Col. Morse had been president since 1931, having spent 55 yr. with the company.

Mack-International Motor Truck Corp., New York, has named E. G. Ewell, formerly vice president, general sales manager of the company's Eastern, Atlantic and Southern sales divisions, in charge of Mack truck, bus and fire-apparatus sales activities in the eastern half of the U. S., with headquarters in New York. A. F. Fenner, vice president, has been named general sales manager, with headquarters in Chicago, and will direct the company's truck, bus and fire-apparatus sales and service activities in its central, southwestern and Pacific Coast Divisions, as well as Mexico. Mr. Ewell, with the company since 1924, and Mr. Fenner, with it since 1915, formerly were managers of the southern and central divisions, respectively. Pierce J. Fleming, formerly St. Paul branch manager, has been appointed manager of the company's off-highway sales division, and John Walker has been named manager of Mack's off-highway sales engineering division.

David E. Davidson has been elected vice president for sales, Link-Belt Co., Chicago. With the company in various capacities since 1924, Mr. Davidson has been general manager at the company's Pershing Road plant, Chicago, since 1947. Eugene P. Berg, formerly assistant general manager, has been appointed general manager of the Pershing Road plant, to succeed Mr. Davidson.

Marshall L. Noel, formerly vice president of Allis-Chalmers Mfg. Co., and general sales manager of the Tractor Div., has joined the Tractomotive Corp., Deerfield, Ill., as vice president and treasurer. Mr. Noel was associated with the A-C Tractor Div. for more than 21 yr.

General Brehon Somervell, president, Koppers Co., Inc., since May, 1946, also has been named chairman of the board of directors, succeeding J. P. Williams Jr., retired. W. F. Munnikhuysen, vice president and general manager of the company's Wood Preserving Div., has been elected executive vice president of the parent company. H. R. Condon has been named vice president and general manager of the Wood Preserving Div., succeeding Mr. Munnikhuysen. Mr. Condon had been a vice president in the division since 1929 and is widely known throughout the industry. Two major appointments in the division were later announced by Mr. Condon. Walter P. Arnold was named executive assistant to the vice president and general manager, and Frank H. Fischer was named assistant general manager. In his new position, Mr. Arnold also will retain the responsibility for railroad sales which he has held since November, 1946. Mr. Fischer, who has been Pittsburgh district manager for the division, succeeds Mr. Condon as manager of division activities in the eastern half of the country.

R. S. Stevenson has been named general sales manager of the Allis-Chalmers Tractor Div., Milwaukee, succeeding Marshall L. Noel, resigned. Mr. Stevenson has been associated with Allis-Chalmers since 1933 and has served as assistant general sales manager of the division since 1948.

Cardox Corp., Mining Div., Chicago, has named W. R. Hennessey district manager for Indiana and western Kentucky, with headquarters at 307 N. W. Fifth St., Evansville, Ind. Mr. Hennessey joined the Cardox organization in 1948 and formerly was assigned to field engineering in Indiana.

Quaker Rubber Corp., Div. of the H. K. Porter Co., Inc., Philadelphia, has opened a new stock-carrying branch with a complete inventory of industrial rubber products at 311 First Ave., Pittsburgh, Pa. The new branch is under the direction of H. M. Sossaman, formerly assistant general sales manager for Quaker.

Harnischfeger Corp., Milwaukee, has appointed A. G. Hendrickson assistant sales manager of the P&H Welding Div. Mr. Hendrickson, for 5 yr a welding engineer in the Milwaukee and the Minneapolis territories, will be assistant to Melvin O. Monsler, recently named sales manager.

E. G. Schroeder has been appointed sales manager of the Electric Products Co., Cleveland. Mr. Schroeder formerly was field sales manager for the company and, prior to that, district manager of the Detroit office.

Free training courses on diesel-powered trucks and buses are to be offered by the Mack Truck Co., New York, in 60 cities throughout the country to meet the "mounting need and opportunity for trained diesel mechanics everywhere, due to the rapid shift to diesel power in trucks and buses," H. W. Dodge, executive vice president, recently announced. To "take the mystery out of the diesel" and to show that a competent gasoline-engine mechanic can, with a relatively small amount of training, become an equally competent diesel engine mechanic is Mack's aim in establishing these courses, he stated. Sessions run 2 hr one evening a week for 10 weeks and those eligible include truck owners, maintenance superintendents, shop foremen, garage or service-station mechanics and others employed in the maintenance or operation of trucks and buses. More than 5,000 men reportedly have enrolled in the first three courses, started in New York, Boston and Albany.

Rockbestos Produce Corp., New Haven, Conn., has opened a new district office in New Orleans, La., for servicing of the states of Louisiana, Texas, Mississippi, Alabama, Georgia and Florida. Warren S. Jones, formerly in charge of the Glendale, Calif., office, has been appointed district manager for the new office.

Duff-Norton Mfg. Co., Pittsburgh, Pa., has appointed Charles R. Ellicott Jr. eastern district sales manager, with headquarters in New York City. Mr. Ellicott formerly held sales engineering positions with Westinghouse Electric Corp. and Symington-Gould Corp.

Electric Equipment Co., Rochester, N. Y., has named Sidney Gilbert a vice president and has promoted Warren A. Hafner from shop superintendent to manager of consumer sales.

General Tire & Rubber Co., Akron, Ohio, has appointed A. T. Morgan, a veteran of 21 yr in the tire business, territory manager in central Pennsylvania, with headquarters in Harrisburg. B. L. Crowe has been promoted to manager of new accounts in the company's southern division. He has been succeeded as territory manager in southern Alabama and northwestern Florida by C. E. Williams.

Eriez Mfg. Co., Erie, Pa., has been appointed distributor in the United States and Canada for R.C.A. electronic metal detectors, which reportedly will warn of any metal becoming embodied in materials being

PARIS MANUFACTURING COMPANY

Announces

THREE *NEW* DRILLS

The PARMANCO Coal Drill will drill 2½ inch holes at a speed of up to six feet per minute in #5 coal. Equipped with heavy duty truck-type transmission and rear end and a complete hydraulic feed, the drill is operated by one man from the control seat. It is made in two sizes with a 12 h.p. or 25 h.p. gas motor and all units are completely self-contained and enclosed in oil-tight cases.

ALREADY USED by

United Electric Coal Companies 9	Knox Coal Mining Co..... 1
Ayrshire Collieries Corp..... 2	Huntsville Sinclair Mining Co. 4
Big Bend Collieries, Inc..... 1	Truax-Traer Coal Company.... 1
	Little Sister Coal Corp..... 1

THIS UNIT IS DELIVERING 6-INCH SHOT HOLES — READY FOR LOADING at Better Than a Foot a Minute ! ! !

The new PARMANCO Hi-Speed Horizontal Drill is completely redesigned around a 40 h.p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time —a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

NEW!
individually
REGISTERED
and completely
GUARANTEED
ROXCO
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TRIMONT MFG. CO. ROXBURY MASS. U.S.A.
Special
MONEY-BACK
TRIAL OFFER!
Buy one "Registered" Roxco and use it for your toughest jobs. If you don't agree it stands up better . . . is handier, faster to use . . . is a bigger value than any pipe wrench you've ever used . . . return that one trial Roxco direct to us (not the seller), within sixty days with a note of price paid and reason for returning. We will refund your money. This get-acquainted offer good until Dec. 31, 1950. Trimont Mfg. Co., Roxbury, Mass.

✓ Check these "engineered" features

1. **Extra Strength** from extra metal put at critical points . . . withstands heavy "side pull" . . . saves costly failure.
2. **Lighter, Handier** because useless metal is eliminated.
3. **Stronger Jaws** of drop-forged alloy steel, with induction hardened teeth but a tough core.
4. **Reinforcing Shoulder Behind Jaw** resists unusual stress.
5. **Rapid Ratcheting Action** — New cushion action, with tooth design, avoids seizure and permits fast work. Parts fit accurately — less lost motion.
6. **Wide, Palm-fitting Handle** makes work easier, cuts worker fatigue.
7. **Reinforced Housing** embodies hammer face to break cast fittings.
8. **Handy, Accurate Pipe Scale** permits quick adjustment to size.

Special Metallurgical Formula — Roxco Metal, and scientific heat treating, mean superior strength in housing and handle.

A Brute for Strength . . . A Beauty to Handle! Now you need not tolerate useless weight in order to get a dependably strong pipe wrench. Through stress analysis during design, useless metal that means tiring weight was engineered out of the new *Roxco*. Extra metal, exactly where needed for extra strength, was engineered in!

The lighter, handier, faster-working *Roxco* actually exceeds strength requirements of Federal Specifications for Heavy Duty Pipe Wrenches, Type II, GGG-W-651a. Scientific design, special alloy metal and careful quality-control enable us to register every *Roxco* by serial number and guarantee *every* part of it against breakage in any normal heavy duty use! Made in sizes from 6 in. to 48 in. Write for folder and names of local suppliers.

TRIMO-ALLOY WRENCH . . . Roxco's only Rival . . . an all alloy-steel heavy duty pipe wrench long famous for ruggedness. Different in design, but has power comparable to Roxco.

TRIMONT MANUFACTURING CO.
Division of Aetna Industrial Corporation
55 Amory Street, Roxbury 19, Mass.
Makers of Wrenches, Pipe Cutters, Vises and Other Trimo Time-Tested Tools.

processed by bell, light, etc., and also can be set up to halt conveyor lines.

Industrial Div., Continental Gin Co., Birmingham, Ala., has opened a New York office at 220 E. 42nd St., to handle domestic and export activities of division in the East. District manager in charge of the new office is A. Walter Gotta.

Purchase of the Semler Co., Jeannette, Pa., has been announced by Charles F. Kennedy, president, Kennedy Valve Mfg. Co., Elmira, N. Y. Manufacturing operations reportedly will be continued at the Jeannette plant of the Semler Co., which has been engaged in the manufacture of cast-iron pipe fittings since 1915. New officers of the company are Charles F. Kennedy, president; J. Lawrence Kennedy and Howard P. Semler, vice presidents, and Thomas S. Turkington, controller.

Rice Pump & Machine Co., Milwaukee, formerly a division of Milwaukee Chaplet & Mfg. Co., has been established as a separate corporation. R. D. Houghton, formerly division manager, has been elected president and treasurer of the new corporation. Erwin Losse, formerly superintendent of the division, is secretary, and Robert G. Rice, president of Milwaukee Chaplet, is vice president.

Reliance Steel Products Co., McKeesport, Pa., has appointed Levinson Steel Sales Co., Pittsburgh, Pa., as its exclusive representative in the tri-state area for sales of Reliance grating and stair treads, which is to be available for immediate delivery in the area.

Myron R. Coughenour has been promoted to the newly created position of assistant general manager, Connellsville Mfg. & Mine Supply Co., Connellsville, Pa., in addition to his previous duties as engineering manager.

Paul M. Barlow, formerly manager of mining sales, Mines Equipment Div., Joy Mfg. Co., has joined C. B. Locke Co., Charleston, W. Va., as manager of sales and engineering. Cleve Meador has been named secretary-treasurer of the company.

Otho V. Tally, manager of the St. Louis district since 1943, has been named manager of the Midwest region of the Allis-Chalmers Mfg. Co., with headquarters in Chicago. Mr. Tally succeeds Benjamin F. Bilsland, who retired July 1 after more than 30 yr of service with the company. Baldwin G. Witty, with A-C since 1933 and formerly a sales representative in the Chicago office, has succeeded Mr. Tally at St. Louis manager.

Western Machinery Co., San Francisco, has consolidated its Western-Knapp Engineering division with its manufacturing division to create a new division of the firm to be known as the Wemco Division. Ralph B. Utt, formerly general sales manager, has been named general manager of the division.

NEW EFFICIENCY FOR YOUR CHAIN CONVEYORS...

LONG Superflite CONVEYOR CHAINS

More Tonnage!

Fewer Breakdowns!

LOOK AT THESE *Continuous-Flow* FEATURES

Stronger flights stay straight . . . run free! Exclusive double flange flight design (patent pending) is at least 300% stronger. Superflite flights can't bend because they will withstand far more stress than the shear pin.

Effective shear pin protection! Pins shear *before* obstruction causes damage to flights or any other part of the conveyor.

Fewer stoppages — minimum maintenance! Because Superflite flights do not bend, they maintain ample clearance and therefore can't jam the conveyor. This eliminates the "vicious cycle" of bent flights damaging pan joints which in turn bend more flights.

Premium grade materials—longer wearing parts! Only the finest material is used in Superflite chains to provide over 25% more strength. Side bars, pins and rivets are heat treated. Block links are highest quality heat treated alloy malleable castings. Flights have special broad wearing surfaces.

Exclusive double lock design! Double locked pin and rivet construction prevents premature wear caused by pins turning in side bars.

BALANCED BLOCK LINK DESIGN ASSURES **BALANCED STRENGTH!**

In Superflite L-60 chain, flight side bars and adjacent block links are heavier to successfully withstand eccentric loads and shocks, which are spread throughout the chain equally.

Superflite CONVEYOR CHAINS ARE INTERCHANGEABLE ON ALL STANDARD 12" AND 15" TYPES AND ARE STANDARD EQUIPMENT ON LONG CHAIN CONVEYORS

Write for complete details and demonstration

LONG SUPER MINE CAR CO., INC.

FAYETTEVILLE, WEST VIRGINIA

Manufacturers of new, improved chain conveyor equipment for modern mining.

Leveling of Market Demand Reported in Many Areas

The pent-up backlog of coal demand resulting from the work stoppages and three-day work weeks of the past year apparently has disappeared within a month after the return to work under the new contract, according to reports of temporary layoffs and closure of high-cost mines received early in April.

While newspaper reports indicated that lack of orders were causing temporary or permanent shutdowns in various sections of Pennsylvania, West Virginia, Ohio and the Middle West, bituminous production still was continuing at a high level according to estimates of the U. S. Bureau of Mines. Output for the week ending April 8 totaled 11,425,000 tons, as compared with 11,940,000 tons the previous week, and 11,453,000 tons for the corresponding week in 1949. Production during the week of April 15 was estimated by the Bureau at 11,330,000 tons. Anthracite production for the week of April 8 was 816,000 tons, against 1,031,000 tons the previous week and 962,000 tons the same week in 1949. Output for the week of April 15 was 778,000 tons.

Reduced demand was attributed to two major causes: the slowness of coal buyers to make long-range contracts, in anticipation of price cuts; and the increased dumping of cheap foreign oil on eastern markets. Some producers were reported to be absorbing the major part of the cost increases necessitated by the terms of the new contract and large-scale buyers were said to be planning on lessening demand in certain areas resulting in definite concessions by producers. Installation of alternate oil-burning equipment during the unsettled conditions of the past year had put many coal customers in a position to take advantage of the low-priced foreign oil.

Mines reported as permanently closed appeared to be high-cost operation affected by a combination of increased labor costs and leveling of demand. At least one producer reported that although it had indefinitely closed two mines, its present annual capacity was greater than it was in 1948.

In the anthracite region, 500 miners at the Mahanoy City colliery of the Philadelphia & Reading Coal & Iron Co. were told April 5 that they must increase daily output to 1,650 tons or expect the mine to be closed May 1. According to reports, George A. Roos, vice president in charge of operations, said that the output demanded was "not impossible since it was many times exceeded in 1947." That figure would enable the mine to break even "without realizing a profit," he said. John O'Shinsky, vice president, District 9, UMWA, was reported as stating that the company's demands "were entirely possible and practical." Current production had been running about 1,275 tpd, it was said. In northern West Virginia, one large bituminous producer was reported planning to hold a series of meetings with miners to explain the current market situation and ask their cooperation in getting higher output per man and better quality coal.

Coal-buying plans of the Consolidated Edison Co., New York, highlight the effects of unsettled labor conditions on one of the bituminous' industry largest consumers. According to recent information obtained by *Coal Age*, this company consumed 9½ million tons in 1948 and at its normal rate of growth would have

Television Commentator Gets Background for Peabody Coal Show

PREPARATORY to launching a new television program for the Peabody Coal Co., Clifton Utley (left), well-known radio and TV news commentator, is shown on an underground tour of the company's Mine No. 43, Harrisburg, Ill., accompanied by Stuyvesant Peabody Jr., president; Lloyd Anderson, Southern Illinois division superintendent; and Frank White, vice president in charge of operations. The new program, which was scheduled to start April 18, is a 15-min news program on Tuesday and Thursday nights at 10:30 pm, CST, over WNBQ, Chicago. In addition to the news, Mr. Utley will tell how coal is mined today and discuss, with accompanying pictures, the improvements in efficiency and safety resulting from mechanized operations.

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SUNVIS SLASHES DOWNTIME

Sticking Valves and Rings, Blow-by, Crankcase Dilution, Bearing Failures—All Are Practically Eliminated

A coal mining company, working six strips at one time, kept 26 bulldozers operating continuously on a three-shift schedule.

The dozers lost efficiency from inadequate lubrication. Frequent oil changes did little to correct sticking valves and piston rings, blow-by in the cylinders, and consequent crankcase dilution. Bearing failures occurred frequently and every shutdown of a dozer cost two full days of its production.

After experiencing the same poor results with two different oils, the company consulted a Sun representative, and on his recommendation turned to the use of a heavy duty Sunvis Oil. Marked improvements were immediately achieved. Freedom from hard carbon keeps valves and rings operating efficiently. Blow-by is no longer a problem. Crankcase dilution has been minimized so that oil change periods are now safely extended. Bearing failures due to faulty lubrication have been done away with. Production goes on according to schedule, and operating costs are much lower.

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COAL MEN ON THE JOB

INSPECTING THE OPERATING HEAD of a new machine, the "Merrill Miner," are Lee Fraley (left), chief electrician, and W. O. Fielding, superintendent, Henlawson (W. Va.) mine, and C. W. Jones, president, Merrill Coal Co.

TAKING TIME OUT from some serious business to pose for Coal Age, A. T. Patterson (left), assistant to the general manager, Arnold Workman, superintendent, No. 5 mine, and L. F. Workman, general manager, Lorado Coal Mining Co., Lorado, W. Va.

INSTALLATION of surface electrical equipment at the new Porter Tunnel now under construction by P.&R.C.&I., Pottsville, Pa., is under the supervision of William H. Hoffman (left), chief electrician. Robert J. Emigh (right), general superintendent, Morrisdale Coal Mining Co., Morrisdale, Pa., soberly views the deepest snowfall of the 1949-50 season, hoping it ends soon.

ANTHRACITE PRODUCTION from pitching veins, by slant methods in the Mammoth and breast-and-pillar mining in the thinner veins, at Raven Run Coal Co., Wilburton, Pa., is supervised by John A. Novatnak (left), mine superintendent. Richard T. Green (right), outside foreman, has the job of coordinating supply, transportation and surface safety.

More Coal-Men-on-the-Job pictures appear on other pages in this section.

expected to consume about 11 million tons in 1951. In 1949, however, it used 7½ million tons and expects to consume 3.7 million tons in 1950.

Purchases in 1950 are to total 5½ million, the additional 1.8 million tons being used to build up depleted stockpiles. The undependability of its coal supply drove the company to the expedient of installing alternate oil-burning equipment, it was said, and the availability of such facilities make it possible for it to utilize the cheap foreign oil currently available. Consolidated Edison's present ratio of oil-to-coal consumption is reported at 60:40. Any further displacement of coal is not expected in the immediate future, the company taking the position that such a step would unduly endanger the position of the coal industry and in turn bring about a security risk in case of an emergency.

Sherwood Heads Bituminous Coal Research

R. H. SHERWOOD, Indianapolis, last month was elected president of Bituminous Coal Research, Inc., succeeding J. B. Morrow, vice president, Pittsburgh Consolidation Coal Co., Pittsburgh, who resigned. Mr. Sherwood is widely known throughout the industry and is president of the Central Indiana Coal Co., Sherwood-Templeton Coal Co. and Little John Coal Co. Following his resignation at the BCR's directors' meeting in Pittsburgh April 7, Mr. Morrow was elected a member of the executive committee, replacing C. J. Potter, president, Rochester & Pittsburgh Coal Co., resigned. Mr. Potter continues as a member of the board of directors.

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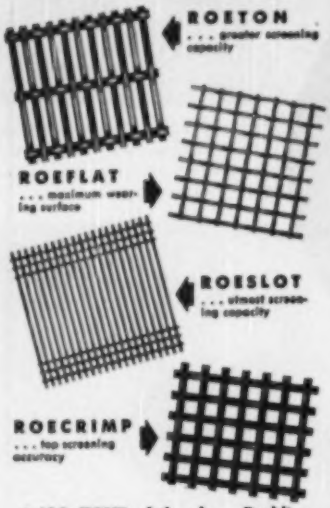

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Old Timers' Club Honors Lafayette Senior

THE OLD TIMERS' CLUB AWARD to the outstanding senior in mining engineering at Lafayette College was a feature at the John Markle Foundation Convocation held at the college April 4. Jacob H. Sherrard Jr., of Brownsville, is shown above receiving the engraved gold watch from George H. Deike (left), president, Mine Safety Appliances Co., secretary of the club. Between them is Lewis E. Young, consulting engineer of Pittsburgh, the main speaker at the convocation, who discussed "New Developments in Underground Mining of Bituminous Coal." At the right is Prof. William B. Plank, head of the Lafayette department of mining and metallurgical engineering, who presided.

Columbus Dispatch

Junior Executive Group to Help Lorain-Lorado Operations

TO HELP IN COORDINATING the functions of the various company departments and to assist in their smooth operation, the Lorain Coal & Dock Co., Columbus, Ohio, has formed this new Junior Executive Committee including representatives of the operating, personnel, accounting and sales division.

Members of the group are: S. B. Johnson Jr. (standing, left), operating assistant to the president; H. C. Walter, personnel manager; R. L. Crow, sales manager; W. H. Barrett (seated, left), executive assistant to the president; and D. O. Reeves, general auditor. At its first meeting, the committee elected Mr. Barrett chairman, and Mr. Reeves secretary.

Through their daily activities and frequent trips into the field, committee members will have the opportunity of keeping in close touch with the activities of all departments. They will cooperate with department heads by helping to investigate problems that arise and obtaining suggestions for improvement. The group will hold

No. 1 DIESEL for Tough Jobs

One of a fleet of seven Euclid rear dump trucks, powered by GM Series 71 Diesels, working 16 hours a day in the phosphate mine of Simplot Fertilizer Co., Pocatello, Idaho.

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Complete laboratory and testing facilities available for separation tests on your materials.

STEARNS Circular Suspended Magnet for inclined installation over head pulley.

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MEETINGS

- Midwestern Retail Coal Association: annual meeting, May 15-16, Savery Hotel, Des Moines, Iowa.
- Virginia Coal Operators' Association: annual meeting, May 18, Norton, Va.
- Smoke Prevention Association of America: annual conference, May 21-25, Mount Royal Hotel, Montreal, Can.
- Canadian Retail Coal Association: annual meeting, May 22-23, King Edward Hotel, Toronto, Ont., Can.
- Mine Inspectors' Institute of America: 40th annual convention, June 5-7, Hotel Prichard, Huntington, W. Va.
- Stoker Mfrs. Association: annual meeting, June 15, LaSalle Hotel, Chicago.
- American Retail Coal Association: annual meeting, June 13-14, St. Louis, Mo.
- Rocky Mountain Coal Mining Institute: annual meeting, June 19-21, Hotel Colorado, Glenwood Springs, Colo.
- Mining Society of Nova Scotia: annual meeting, June 26-27, Cornwallis Inn, Kentville, N. S., Canada.

regular monthly meetings, at which members will discuss, analyze and exchange ideas on the various problems and suggestions and make the necessary recommendations.

Obituaries

Samuel L. Bastin, 83, one of the pioneers in the development of the Eastern Kentucky coal fields, died March 28 at his home in Lexington, following a long illness. Mr. Bastin entered the coal business some 60 years ago near London, Ky. Many years later he helped organize the Elkhorn Coal Co., at Kona.

Last year Mr. Bastin acquired full ownership of the company, with his son, Arthur L. Bastin, of Kona, who has been in active charge of the operations.

Grover H. Creech, 52, a representative of the Randall Fuel Co. and formerly associated with the Creech Coal Co., Pineville, Ky., died March 27 in the Norton Memorial Hospital, Lexington, after an extended illness. Mr. Creech formerly was a trustee of the University of Kentucky and also was a member of the executive committee of the university's alumni association.

George M. Barney, 63, for many years a construction foreman at the Truesdale colliery of the Glen Alden Coal Co., died April 3.

Mechanized mining requires powerful, fast moving mine haulage locomotives to increase mine output. Operating speeds of 12–15 mph and high continuous ratings with G-E mine locomotives will get the coal out faster, and slash operating expenses at the same time!

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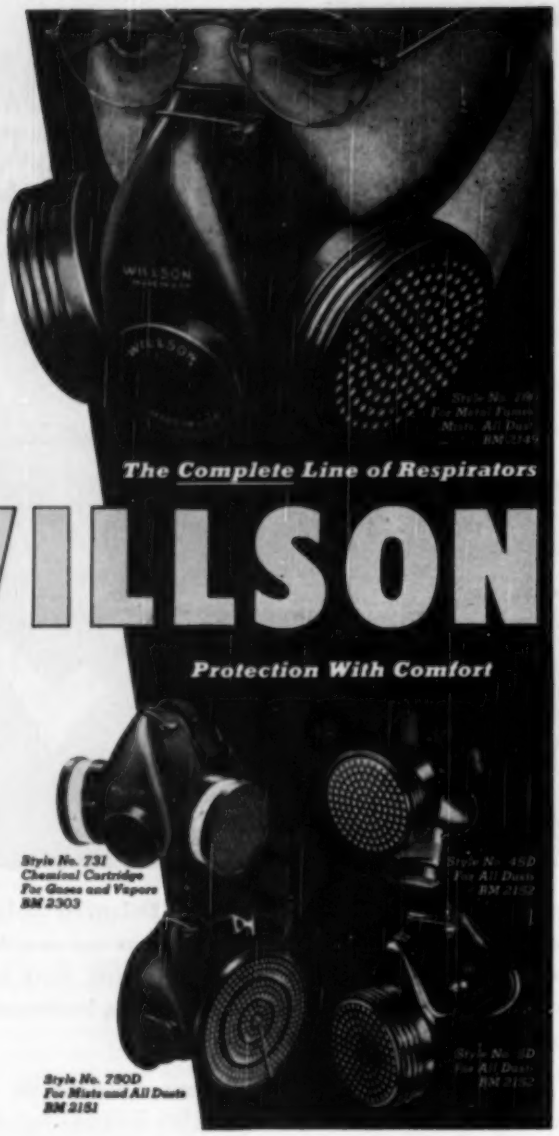
GENERAL ELECTRIC



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EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in March, as follows:

Goodman Mfg. Co.—Type RHT2 tractor truck; two 5-hp motors; 250 v, dc; Approval 2-719; March 8.

Goodman Mfg. Co.—Type 460BHR loader; two motors, 50 and 8 hp, 250 v, dc; Approval 2-720; March 8.

Huwood-Irwin Corp.—Type HIR room conveyor; one motor, 10 hp, 250 v, dc; Approval 2-721; March 17.

Ensign Electric & Mfg. Co.—Bulletin No. 5411 pump unit; one motor, 5 hp, 250 v, dc; Approval 2-722; March 20.

Joy Mfg. Co.—Type T2B-5APG/H/KK truck; two 4-hp motors, 220, 440, and 550 v, ac; Approvals 2-723 and 2-723A; March 29.

Mines Bureau Establishes New Roof-Control Group

To provide increased technical advice and consultation service on coal-mine roof-control problems a Roof-Control Section has been established at Bureau of Mines' Headquarters in Washington, D. C.

Named chief of the new section was Edward M. Thomas, mining engineer, who has been in charge of the roof-control unit set up last August. The newly-created section, under the general supervision of the Health and Safety Division, will assume some of the roof-control activities formerly carried on at College Park.

The roof control unit established last year was concerned primarily with investigating methods for preventing accidents from falls of roof and considerable time was devoted to experimental installations of roof-bolting. Where applicable, this method offers substantial possibilities for greater progress in the prevention of accidents from falls of roof in bituminous coal, anthracite, and metal mines, the Bureau points out. Up to the first of this year, it estimates, about 200 coal mines had adopted this method on an experimental basis. In these mines, approximately 714,000 roof bolts had been installed and were supporting an estimated 14,000,000 sq ft of roof surface.

As chief of the Roof-Control Section, Mr. Thomas will serve as a consultant and technical advisor on matters relating to mine roof control. Mr. Thomas was graduated from the South Dakota School of Mines in mining engineering in 1926 and spent several years as a state inspector of mines in North Dakota and as an operating official in anthracite mines in Pennsylvania. He joined the field forces of the Bureau of Mines in 1936 and has served as a safety instructor, federal coal-mine inspector and mining engineer.

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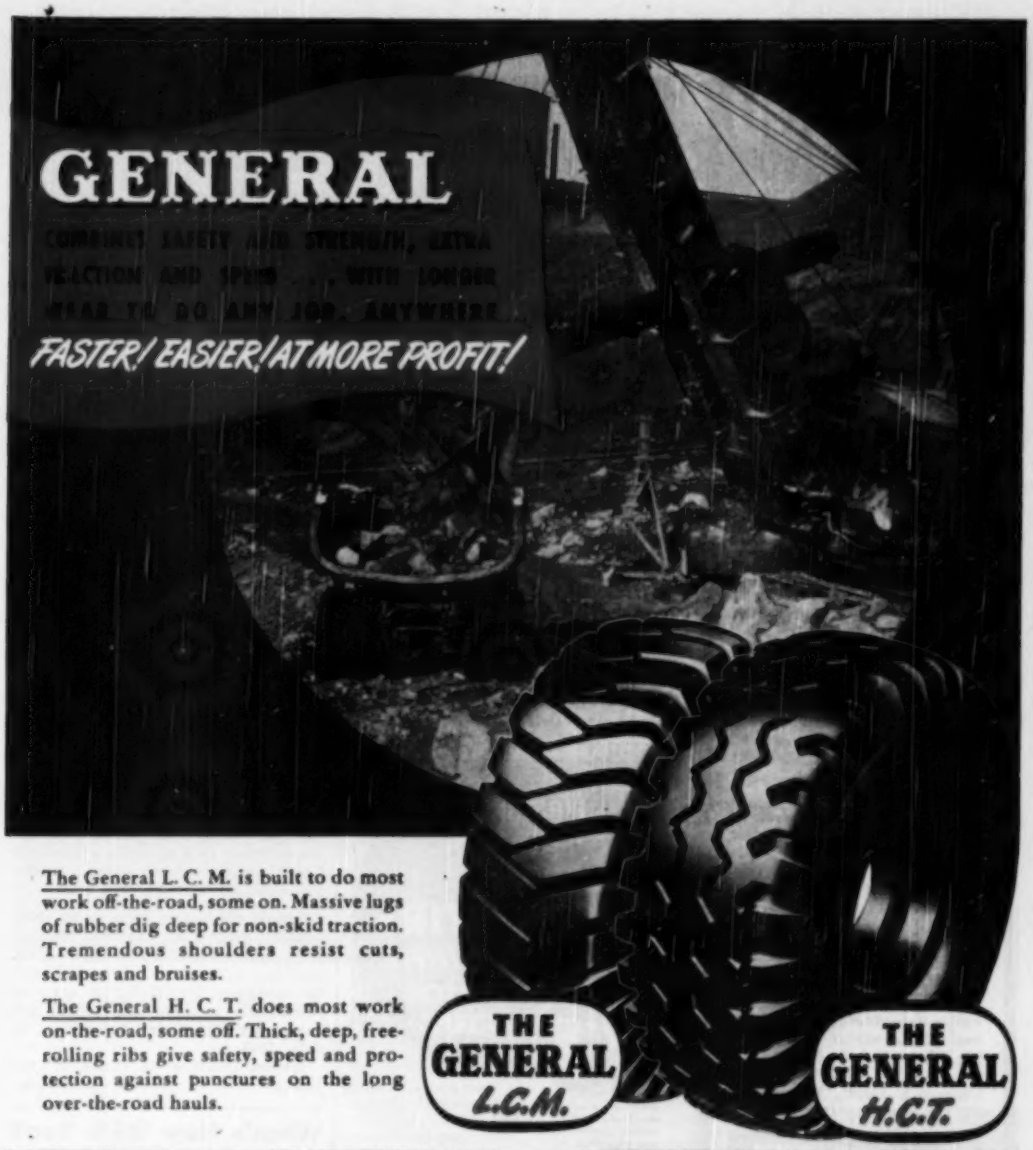

The General L. C. M. is built to do most work off-the-road, some on. Massive lugs of rubber dig deep for non-skid traction. Tremendous shoulders resist cuts, scrapes and bruises.

The General H. C. T. does most work on-the-road, some off. Thick, deep, free-rolling ribs give safety, speed and protection against punctures on the long over-the-road hauls.

In soft, slushy ground the General L. C. M. bites in for extra traction, forward or backward. Broad lugs keep tires on top of soft surfaces.

General H. C. T. rolls safely over the highway to off-the-road delivery points; gives extra traction when you need it most.

Heavy loads require extra strength and stopping-power. The General H. C. T.'s extra deep tread works faster, lasts longer, runs and stops safer.

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This salt-type wood preservative makes lumber and timber unpalatable to termites . . . kills decay-causing fungi . . . gives a high degree of fire retardance. Copperized CZC does all this while leaving wood clean, paintable, odorless and safe to handle. Sound reasons why you should specify pressure-treatment with Du Pont Copperized CZC.

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COAL MEN ON THE JOB

UNDERGROUND at the Regent mine, Linton-Summit Coal Co., Sullivan, Ind. (left to right): Oscar Williams, G. R. Thompson, W. Alumbaugh, Sam Masters, A. Templeton, Alva Engle, H. Johnson, G. Bedwell, R. T. White and Dale Pershing. Mr. Engle is general mine foreman, Mr. Masters is ventilation supervisor and the others are section foremen. For a description of trackless operation at Regent mine, see p 70 of this issue.

Personal Notes

A. E. Roberts retired at the end of March as division engineer of the Monroe Coal Mining Co., a part of the Bethlehem Collieries Corp., Revloc and Nanty Glo, Pa. **John C. Lowry**, formerly superintendent of the Heilwood mine of the Red Lands Coal Co., another Bethlehem operation, has been named to succeed him. Mr. Roberts, 71, is a graduate of Penn State College and has been associated with the Monroe organization for 35 yr. He was the first superintendent of Monroe mine, serving in that position until he became chief engineer in 1928. Mr. Lowry, also a graduate of Penn State, is a veteran of 35 yr in the coal industry. He joined the Monroe company in 1940 and a short time later became superintendent of the Heilwood mine.

Allard Hostetter, general superintendent, New York Coal Co., Nelsonville, Ohio, retired March 25, his 65th birthday, after 34 yr of service with the company. Mr. Hostetter came to Nelsonville in 1900 and joined the company's engineering department in July, 1906.

Recent changes at mines of the Eastern Gas & Fuel Associates in-

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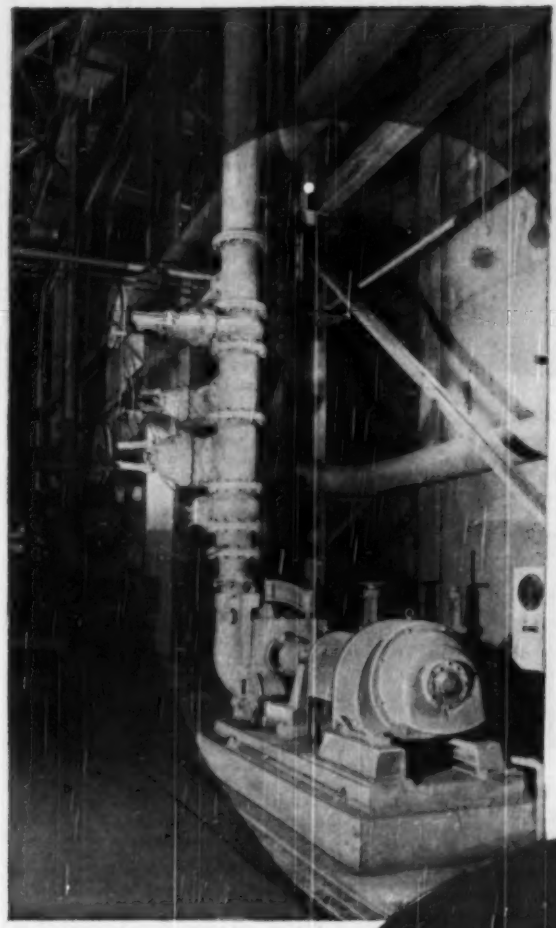
What's New With You?

MANY COAL-MINING COMPANIES make it a point to write us of personal changes on their staff for inclusion in COAL AGE'S "Personal Notes" section, as well as other news of their company, such as new mine developments, safety and production achievements, annual staff functions, etc., accompanied by pictures where suitable and available. You, too, are invited to write us whenever the occasion arises—it takes only a minute. Job changes from the individuals concerned also are welcome. Address: News Editor, COAL AGE, 330 West 42nd St., New York 18, N. Y.



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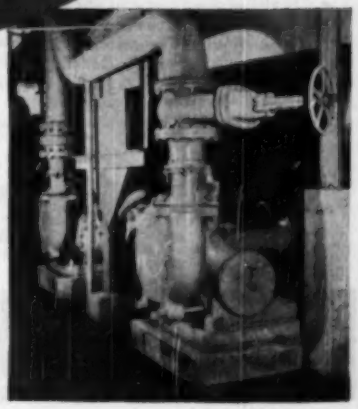

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clude the appointment of **Orville Oney** as chief electrician at Weeksbury mine. At Carswell mine, **Elbert Hill** has been employed as section foreman on the third shift, and **Louis Widugiris** has been promoted from slate foreman to section foreman at Federal No. 1. **H. C. Headley**, formerly a mine foreman for the Croser Coal & Land Co., has joined the company as section foreman at the Keystone mine.

New conveyor section foremen at No. 2 Gas mine include **John R. Gallagher**, formerly with the New River Co., and **Charles H. Wayne**, formerly with Truax-Traer Coal Co., Kayford, W. Va. **Sylvan Meadows**, previously with Kelly's Creek Coal Co., Hugheston, W. Va., has been appointed a section foreman. At No. 6 mine, **John Simpkins** has been promoted to section foreman succeeding **R. Skiles**, who has been made underground maintenance and preparation inspector for Eccles Nos. 5 and 6 mines.

Robert Brownrigg, chief electrician and master mechanic, Frederick mine, Colorado Fuel & Iron Corp., Valdez, Colo., recently received a diamond-studded 50-yr pin in recognition of his half-century of service with the company. Mr. Brownrigg came to Trinidad just before the turn of the century and joined CF&I at Starkville. He was transferred to Frederick as mine electrician in 1910. Two of his sons are associated with the CF&I coal operations. **James K. Brownrigg** is the warehouse and supply man at Frederick and **R. C. Brownrigg** is his assistant. **H. D. Pinkney**, superintendent, Morley and Frederick mines, presented the 50-yr pin to Mr. Brownrigg, who is expected to retire soon and enjoy some well-earned leisure.

Horace B. Holland, executive vice president, C. H. Sprague & Son Co., Boston, has been elected president of the Imperial Smokeless Coal Co., Quinwood, W. Va., a Sprague subsidiary. Mr. Holland succeeds **Richard L. Bowditch**, elected chairman of the Imperial Smokeless board.

Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co., Fairmont, W. Va., has announced several changes in personnel. **George L. Judy**, formerly assistant division maintenance superintendent, has been transferred to Mine No. 32 as assistant superintendent. **Robert D. Sturm**, assistant shop foreman, has been made shop foreman at the central shop. **Chester S. Conrad**, maintenance foreman, Mine No. 25, has been transferred to the central shop as assistant superintendent.

Robert P. Koenig, president of Ayrshire Collieries Corp., Indianapolis, for some 10 yr, has resigned to become president of a large copper company.

Sidney Keene, formerly assistant superintendent, Illinois state mine-rescue station, DuQuoin, Ill., has been

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in stripping and underground operations

Stripping operators and underground-mine officials report more dependable, more profitable results when Du Pont explosives and accessories are used on the job.

Each product in this complete line of explosives and accessories is the result of years of research in Du Pont laboratories and in the field.

This research assures maximum performance from every product . . . eliminates danger and costly waste resulting from inadequate explosives or accessories.

Ask any Du Pont Explosives representative for complete information about these reliable products. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Del.

For stripping operations:

"NITRAMON" is a logical choice. It offers maximum efficiency, comfort in handling, safety and convenience. It's non-headache producing because it contains no nitroglycerin and is packed in water-tight metal cans for safe loading far in advance of firing time.

"NITRAMON" PRIMER, itself relatively insensitive, provides efficient detonation of "Nitramon" using "Primacord."

DU PONT BLASTING TIMER . . . a most dependable means of short-interval firing . . . utilizes either 110, 220, 440, or 550 volt, 60-cycle power supply. Choice of 0.010, 0.015, 0.020 and 0.025 second is provided to reduce vibration and increase fragmentation.

"MS" DELAY ELECTRIC BLASTING CAPS also provide short interval firing. Caps are available in 14 millisecond intervals of delay: MS-25, -50, -75, -100, -125, -150, -175, -200, -250, -300, -350, -400, -450 and -500.

For underground work:

"MONOBEL" AA is a low-velocity, water-resistant explosive with excellent fumes . . . a good producer of big lump coal.

"LUMP COAL" C is a low-velocity permissible designed primarily for thin seams and for mines in which hand drilling is employed. Generally requires smaller number of holes, and produces large, firm lumps that stand up well in handling and transportation.

"GELOBEL" AA is a gelatinous permissible for rock work in coal mines and for blasting coal where work is wet.

DU PONT PERMISSIBLE BLASTING MACHINE . . . a powerful permissible machine of the generator type. It's compact, rugged, light-weight and water-resistant.

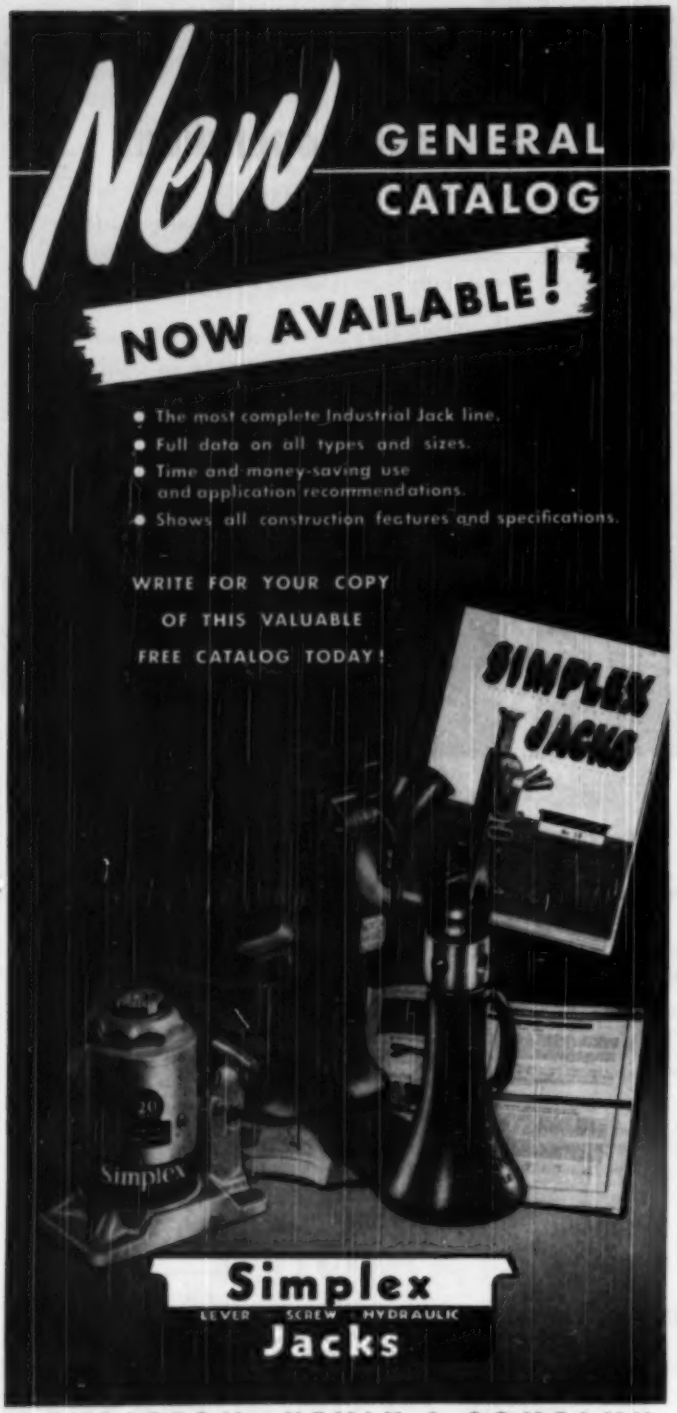
"DETECT-A-METER" . . . a single instrument with two uses. It detects stray currents from 0 to 25 volts. Works equally well on either AC or DC. It also performs all the functions of the Du Pont Galvanometer for checking blasting caps and firing circuits before connecting.

DU PONT EXPLOSIVES

Blasting Supplies and Accessories

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*



TEMPLETON, KENLY & COMPANY
1040 S. Central Ave., Chicago 44, Illinois

appointed a state mine inspector, with headquarters in Canton. Mr. Keene, a veteran of 27 yr in mining, formerly was employed at the No. 14 Majestic mine of the Peabody Coal Co.

Clarence Powell, Allais, Ky., and **Paul Sexton**, Hazard, Ky., have been appointed Kentucky state mine inspectors. Mr. Powell was named for a 4-yr term as an addition to the force, and Mr. Sexton was appointed to serve until Aug. 26, 1951, replacing A. C. **Rudd**, Hazard, resigned.

New Developments

Negotiations for the purchase of the Ontario mine of the Hillman Coal & Coke Co., near Ellsworth, Pa., by the Youngstown Sheet & Tube Co. and steel Co. of Canada, reportedly were under way last month. Acquisition of the property, which has an output of 2,500 tpd, would be another step in the companies' program to build up coal reserves. Youngstown Sheet & Tube would receive 1,600 to 1,700 tpd and the Steel Co. of Canada the balance, it was reported. The mine is said to have a life expectancy of 40 yr.

The Henry J. Kaiser interests, represented by the Book Cliffs Coal Corp., a subsidiary of the Kaiser Steel Co., are reported to be the highest bidder for the 100,000 shares of capital stock of the Utah Fuel Co. The sale was ordered as an outgrowth of the 1947 reorganization of the Denver & Rio Grande Western R. R., of which Utah Fuel is a subsidiary. The Kaiser organization's bid of $6,800,000 is subject to confirmation by the court.

Dr. Evan I. Brown, owner of the Twin River Co., McKeesport, Pa., has resumed operations in Snowden Township, Alleghany County, Pa., on 118 acres of unmined coal, leased from Jones, Inc., Pittsburgh.

The Pond Creek Pocahontas Coal Co., Huntington, W. Va., announced in its annual report that its new No. 2 (Skyline) mine in Breathitt County,

Photographers, Take Note!

COAL AGE WILL WELCOME from you "on-the-job" photographs of coal mining supervisory officials for use in this section. So why not make it a point to photograph your fellow officials in groups of four or five and send us the results. They'll be pleased to have their pictures published and **COAL AGE** will gladly pay you for each photo used, on publication. Please be sure to include the full name, title and mine operation of each individual and enclose the negatives of all photos, which we will return. Address: The Editor, COAL AGE, 330 W. 42nd St., New York 18.

we'll take the "Red Ink" out of your motor repair shop

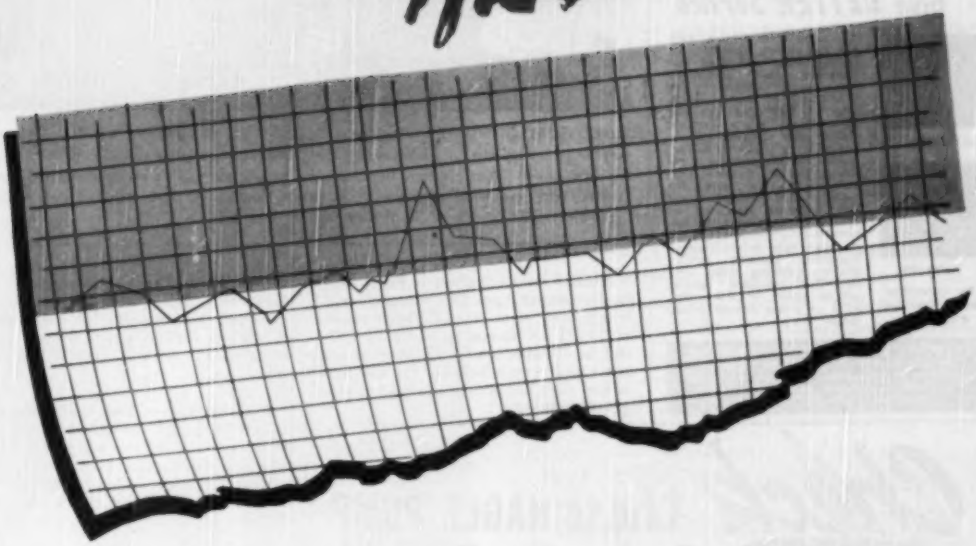


Chart the week-to-week demand and the week-to-week costs of your mine's motor maintenance-repair shop and you'll find that the red ink is concentrated at the periods of peak demand. Normally, the shop probably operates efficiently. But the peak demands cost overtime, and rushed, slighted work. To overcome that condition you'd have to over-equip and over-man your shop. And that means higher cost every day. Many mine operators, on the other hand, are operating such shops with very high efficiency. They are equipped and manned to handle the normal demand; they turn over the peaks — the red ink jobs — to us. Thus they avoid the vicious circle of excessive labor costs and excessive overhead. They get work, too, comparable to the best they can do themselves. We've done so much mine motor and generator work we know how; we're efficient; our costs are low. That means *your* costs are low, both in your shop and in ours. Our engineers will be glad to come to your office to suggest experienced ways and means of taking the top costs out of *your* motor and generator work. Just drop us a line.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.

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Make Good Belts Give BETTER Service

Outside

Pulley side

For Superlative Service from All Flat Belting

For superlative service from ALL flat belting, Crescent, the original Plate and Rivet Belt Fasteners, have unequalled ruggedness. Maintain full STRENGTH of belt for full LIFE of belt. Just cut belt ends square, attach Crescent Plates, with Crescent Rivets. For all kinds of belting rubber, leather, balata, etc. Joints are strong, smooth, noiseless, durable, economical, safe. No metal touches pulleys. Crescent Belt Fasteners are used on conveyor, transmission and elevator belting. Thousands in use on these belts in all types of industries, standing terrific strains, handling coal, ore, etc. For complete details, service charts of sizes, etc., write or phone nearest office, today.

CRESCENT BELT FASTENER COMPANY

COAL MEN ON THE JOB

SUPERVISORY OFFICIALS of the Boone County Corp., Sharples, W. Va., include: H. L. Copher (standing, left), superintendent; T. W. Cline, general mine foreman; E. D. Pennington and Lowell Elkins, section foremen; Foy Miller, haulage foreman; Everett Stallard (seated, left), maintenance foreman; Carl Mann, Lake Smith, K. R. Waddell and William Shirley, section foremen.

Kentucky, was expected to begin production about April 15. The property, which will mine the Elkhorn seam, will have an annual capacity of 600,000 to 700,000 tons. Opening of the mine had been scheduled for the first of the year but was delayed by industry conditions.

Check these NAGLE PUMP Design Features!

Quick, abundant slippage seal adjustment
Easy to get at stuffing box
Variety of impellers—readily changed for varying conditions
Motor Mounting to fit any requirement
Water-End Plate off or on in a jiffy

★ Easy to dismantle and reassemble (if corroded remove bolts with acetylene torch.)
★ Repairs made on the spot.
★ Plenty of room for packing.
★ Assemble from either side, or from above.
★ Does not have to be level—even hang it on wall or ceiling.

NEW Catalog 4906 gives other features!

Nagle Pumps
INDUSTRIAL PUMPS FOR ABUSIVE APPLICATION
1237 Center Ave. Chicago Heights, Ill.

The Miller Creek Processing Co., Paintsville, Ky., recently opened its Jan Lear drift mine in Johnson County, on the Millers Creek seam. The property will have a capacity of 500 tpd.

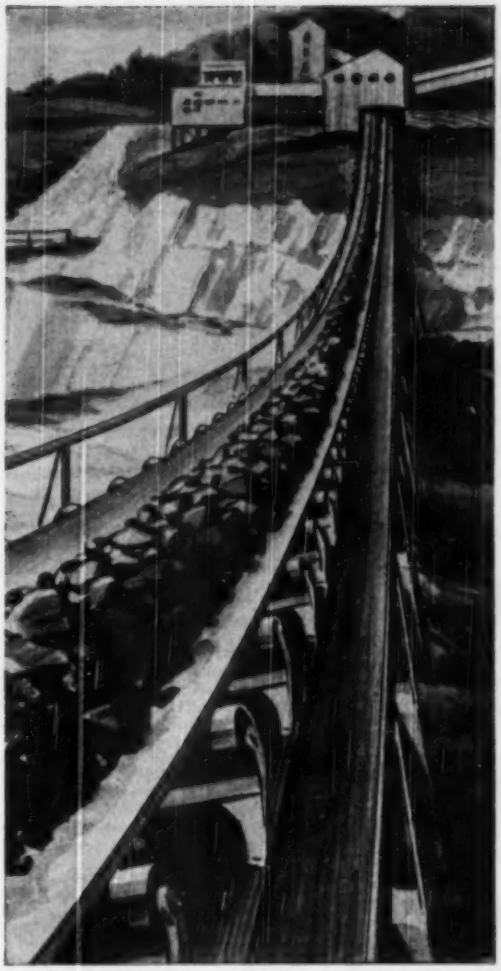
The new Clover Lick drift mine of the Clover Lick Coal Co., Cumberland, Ky., was recently opened. The property is in Harlan County and will mine the Darby seam. Daily capacity is 750 tons, with a life expectancy of 20 yr.

A new strip operation with a life expectancy of 10 yr was recently opened by the Hallett Coal Co., Barnesville, Ohio. Known as the Barnesville No. 1 mine, the Gurnsey County operation has a daily capacity of 700 tons and will mine the Pittsburgh No. 8 seam.

In Pennsylvania, the C. A. Hughes Co. has opened its Lilly No. 7 strip mine on the upper Freeport seam. The operation is to have a daily capacity of 800 tons and preparation equipment includes picking tables and vibrating screens.

The new Wallaceton drift and strip mine recently opened at Philipsburg, Centre County, by the Dagan Coal Co., Osceola Mills, Pa., is planned for a capacity of 500 tpd, mining the "B" seam.

The Old Colony Coal Co. of Virginia, Norton, Va., has begun production at its Old Colony drift mine at Norton, on the Blair seam. Preparation equipment includes crusher, magnets, picking table and shaker screens, and five sizes will be shipped. The property has a life expectancy of 20



LONGER LIFTS. The high tensile strength of "Cordura" Rayon eliminates costly transfer points. For example, a belt reinforced with seven plies of "Cordura" can lift 1000 tons of overburden per hour up a 15° slope over 1000-foot centers. It has design tension of 900 pounds per inch of width.

POINTS TO CONSIDER BEFORE YOU BUY YOUR NEXT CONVEYOR BELT

Shown on this page are some of the reasons why more and more economy-minded operators are planning to have their next conveyor belt built on Du Pont Cordura* High Tenacity Rayon.

"Cordura" has so much extra strength over natural fibers previously used that it provides a thinner yet stronger belt . . . at no extra cost.

You may already know "Cordura" Rayon as the yarn that makes tougher truck tires, stronger high-pressure hose and longer-lasting V-belts. We'll be glad to send you the names of suppliers of conveyor belts improved with this industrial rayon.

You can also get full information about "Cordura" in the new manual, "Sinews for Industry." It gives physical properties of "Cordura" rayon, describes many successful applications and tells how "Cordura" improves the efficiency of conveyor systems. For your free copy, address Room 4527, Rayon Division, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

Reg. U. S. Pat. Off.

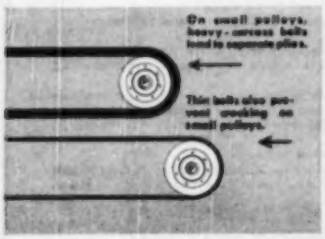
DU PONT "CORDURA" HIGH TENACITY RAYON

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

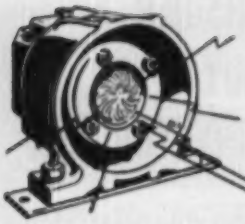
for RAYON . . . for NYLON . . . for fibers to come look to DU PONT

GREATER STRENGTH of belts built with "Cordura" is illustrated above. At left is cross-section of four-ply belt sinewed with "Cordura." It's stronger than conventional 6-ply belt at right, yet only half as thick. This thin, light belt is particularly desirable where panel equipment is moved frequently.



MORE FLEXIBLE. Belts built with "Cordura" have less tendency to crack and separate plies when run over small pulleys required in confined working space. And belts built with "Cordura" have less stretch, so less take-up room is needed. And they trough well under any loading conditions.

HEAVIER LOADING is possible on conveyor belts built with Du Pont "Cordura" High Tenacity Rayon. This yarn is inherently stronger than the natural fibers commonly used. It packs extra strength into conveyor belts and enables them to carry loads to the capacity of power equipment.



Why Worry . . . Trolleyphone!

What's going on in your mine? You'll know when you're there with a Trolleyphone! Femco's push-button talk gives you clear, two-way contact with motormen on the move, foremen at the face,—or anywhere you need better coal control! Keep in touch by Trolleyphone to track down those profits!

"Mine the Modern Way—by Trolleyphone!"

- Constant Supervision
- Cuts Costs and Time
- Cancels Accidents
- for Profitable Production

FARMERS ENGINEERING AND MANUFACTURING COMPANY

TROLLEYPHONE "It Speaks For Itself"

MOBILE POWER on a Rugged CHASSIS

for low-cost, record-breaking performance

it's the McCARTHY SELF-PROPELLED HORIZONTAL DRILL

• The self-propelled McCarthy makes blast holes close to the floor or bottom and it makes them fast!

Actual records show that for operations in shale, sandrock and soft limestone overburdens, these tough, mobile power units easily drill up to 1500 feet per day.

Operators like the compact McCarthy design . . . ideal for working confined areas. They like the four special, individual leveling jacks that make setups easier, and the smooth, steady way the hydraulic carriage moves forward, feeding 4, 6 and 8-inch diameter auger sections into the earth to depths of 100 feet or more.

Write today for the complete story on McCarthy Drills. There's bigger money waiting for you and McCarthy knows how you can get it faster. List of users on request.

SALEM

DRILLING EQUIPMENT SINCE 1901

THE SALEM TOOL CO.

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COAL MEN ON THE JOB

TOP OPERATING OFFICIALS at the Clean Eagle Coal Co. mine, Mallory, W. Va., are Lawrence Vaughan (left), tipple foreman, and C. A. Cook, superintendent.

yr and is to be developed to a daily capacity of 1,000 tons.

A new mine in Tazewell County on the Red Ash seam has been opened by the Red Ash Domestic Coal Co., Richlands, Va. The mine is being developed to 750 tpd and preparation equipment includes vibrating and shaker screens and picking table.

A new strip mine in Randolph County, West Virginia, was recently opened by the Woodstock Coal Co., Altoona, Pa. Known as the Hart No. 1 strip mine, the operation will produce 750 tpd, from the Sewell seam.

The Butler Junction Coal Co., Pittsburgh, Pa., now is operating its Butler Junction mine, Leechburg, Pa., which has been leased to Eastern Gas & Fuel Associates.

The Tolliver Coal Co., near Farraday, Ky., has been acquired by N. J. Lucas, Whitesburg, Ky.

W. Va. Bureau to Launch Mine-Safety Program

An intensive program of promoting coal-mine safety was scheduled to get under way May 1, when the state's five new safety and mine-rescue trucks were to start touring the mining areas, Arch J. Alexander, chief, West Virginia Department of Mines, reported last month.

Included in the program will be demonstrations, lectures and movies. Booklets analyzing the causes of accidents will be distributed to miners attending the special sessions, which will be given in various mining communities throughout the state.

Personnel manning the five trucks were given special training by the department last month.

J&L STEEL

This book tells—*with facts and figures*—just how JALLOY Steel saves money for companies like these:

KELLEY'S CREEK COLLIERY CO.
INTERSTATE IRON CO.
MASSAPONAX SAND & GRAVEL CO.
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Learn how others SAVE MONEY with J&L JALLOY Steel

Is abrasion eating up YOUR PROFITS?

JALLOY heat-treated plate is the steel that is saving users' money through *longer wear . . . less repair.* Every design engineer, operating man and maintenance superintendent should have a copy of this 36-page, illustrated book that shows how much longer JALLOY Steel lasts where abrasion and impact limits the life of equipment. The coupon at the right may help you change losses into profits.

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Without obligation, send me a FREE copy of "JALLOY—J&L Special Alloy Steel," the book that tells how I can reduce maintenance cost through *longer wear . . . less repair.*

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COMPANY_____

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More Profit

WITH BEE-ZEE ROUND ROD SCREENS FOR SIZING AND DE-WATERING

SCREEN OPENINGS CAN'T CHANGE!

Even with 50% wear, Bee-Zee Round Rod Screen openings remain constant. Round Rod principle not only maintains screen accuracy, but eliminates clogging and blinding by its fine point of contact.

A SCREEN WITH 20 LIVES!

Coal operators report that Bee-Zee Screens last 10, 20 — even 30 times longer! Round Rod design is one reason; welded construction of long-wearing stainless steels is another . . . plus built-in tension to reduce fatiguing stresses.

COSTLY "DOWN TIME" REDUCED!

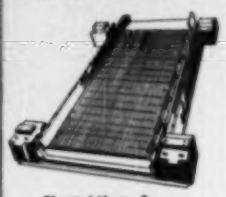
As screen life increases—screen-change shutdowns decrease! Also, all Bee-Zee Screens are engineered for quick and simple installation.

MADE IN ANY SHAPE, ANY SIZE!

Bixby-Zimmer screening experts will specifically design Bee-Zee Round Rod Screens in any shape, size, dimension or mounting . . . to "custom-fit" your sizing or de-watering machinery.

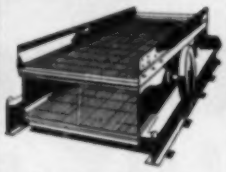
ANY SIZE ANY SHAPE

BEE ZEE



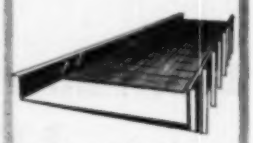
Electric Vibrator Screens CROWN TYPE

Electric Vibrator Screens PANEL TYPE



Mechanical Vibrator Screens CROWN TYPE

Mechanical Vibrator Screens PANEL TYPE



Standard or High-Speed Shakers

Large Low-Speed Shakers

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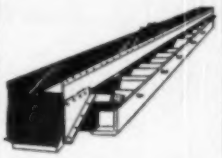

Open Pan or Drag Conveyors

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150 Abingdon Street
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Gentlemen:

Please send me immediately the new Bee-Zee catalog on Round Rod Screens for coal processing . . . at no obligation.

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COST-CUTTING INFORMATION—FREE!

This new Bee-Zee catalog is available to coal men without cost. It explains in detail the money-making advantages of Bee-Zee Round Rod Screens on any type of coal processing equipment. Send the coupon today for your copy.

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Coal Miners Dislike Jobs Illinois Survey Finds

If they had their lives to live over, they would never be coal miners, said 45 out of the 50 men interviewed in an Illinois community, in a survey recently conducted by two University of Illinois psychologists, Drs. James F. Kelly and Thomas W. Harrell.

Danger and unhealthy conditions on the job reportedly were the reasons given by the men for their dissatisfaction with coal mining. Over half thought miners' wages were high enough, but 31% felt that the pay was not in line with the danger and difficulties of the work.

Some 35 out of the 50 questioned said that they believed mine management is fair. John L. Lewis was praised by 64%, while another 24% both praised and criticized him. With only six men did the blame outweigh the criticism.

Many Coal Companies Report Reduced Income

The effects of work stoppages and reduced coal production during 1949 were clearly evident in the recently released 1949 reports of many coal-producing organizations. Among the companies issuing such reports were:

The Lehigh Coal & Navigation Co. and subsidiaries—1949 net income of $2,263,208 based on a group income of $46,950,799, compared with a net of $3,495,932 and a gross of $57,100,390 in 1948.

The Hudson Coal Co. and subsidiaries—1949 loss of $897,059, with gross sales of $36,044,176; 1948 net income of $1,782,775, and gross sales of $46,278,052.

Pittston Co. and subsidiaries—1949 net income of $1,366,947, equal to $2.25 a share on sales of $71,725,218; 1948 net of $5,214,553, or $8.56 a share on sales of $110,506,258.

Franklin County Coal Corp.—1949 net loss of $160,776 on net sales of $3,857,854; in 1948, a net income of

"I can't afford to take a chance on X-SHOCK!"

Herb Fisher, rigging foreman for Morrison-Knudsen Co., Inc. and Peter Kiewit Sons Co., at Grand Coulee Dam, knows plenty about what sudden shock loads can do to wire rope fastenings. He knows that "x-shock"—the unforeseen blow that engineering can't calculate—can snap cheap clips like so many clothes-pins. "I stick to genuine CROSBY Clips," says Herb. "That drop-forged strength is mighty good insurance!"

That's why industry uses more

CROSBY CLIPS

than all other drop-forged wire rope fasteners!

This is the AMERICAN HEAVY DUTY UTILITY SNATCH Block . . . other AMERICAN wire rope blocks from 1½ to 250 tons capacities.

There is only one genuine CROSBY Clip—identified by the famous red U-bolt. Drop forged from finest steel. Hot dip galvanized—a thin tough, chip-proof zinc coat. Machine cut threads, chamfered bolt ends. Sizes for ⅛" to 3" wire rope—at distributors everywhere.

MAIL THIS COUPON FOR FREE BOOK

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American Hoist & Derrick Company

St. Paul 1, Minnesota

● Please send free book showing proper methods of applying CROSBY Clips.

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SHIPPED IMMEDIATELY FROM STOCK

Here's the perfect welding machine for all types of bond welding as well as general repair work in mines where 250-275 d.c. or 500-550 d.c. is used. Both high and low styles are engineered for your convenience under any condition. Can be regulated by 20 ampere steps to full capacity of 240 amps. We also sell a complete line of accessories for electric welding.

Write today for price list.

Mosebach Electric & Supply Co.
1113 Arlington Avenue, Pittsburgh 3, Pa.
Hemlock 8212

Coal and Business Activity

		1950 to This Date	1950 Over 1949, to Date
Est. anthracite prod., week ending April 8.....	816,000	11,223,000	+10.5%
Est. bituminous prod., week ending April 8....	11,425,000	107,557,000	—24.0%

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, net tons)				Consumption (Thousands, net tons)		
	Mar. 1, 1950	Days' Supply	Feb. 1, 1950	Mar. 1, 1949	Feb., 1950	Jan., 1950	Feb., 1949
Electric power utilities....	11,065	43	15,068	24,120	6,397	7,308	7,167
By-product coke ovens ...	3,480	17	7,067	13,729	5,659	7,606	7,835
Beehive coke ovens.....	*	*	*	*	41	152	952
Steel and rolling mills.....	453	20	748	1,121	649	712	812
Cement mills	528	26	877	1,103	579	659	640
Other industrials	6,240	23	9,250	16,963	7,040	8,874	9,867
Railroads (Class I).....	2,093	14	3,010	9,861	4,119	5,320	6,628
Retail dealers	485	1	1,051	1,997	8,864‡	11,136‡	8,567‡
Total	34,534	20	37,119	68,834	34,308	41,355	42,468

Source: U. S. Bureau of Mines. *Not available. ‡Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, wk. ending Apr. 15	202.3	200.7	193.4
Steel ingot operations (% of capacity)	100.0	95.5	98.4
Electric power output (million kw-hr)	5,863	6,015	5,342
Crude oil production (daily avg., 1,000 bbl)	4,999	4,944	4,989
Misc. & L.C.L. carloadings (daily avg., 1,000 cars)	72	69	73
All other carloadings (daily avg., 1,000 cars)	45	49	53
Prices, spot commodity index (Moody's, Dec., 31, 1931 = 100)	359.6	355.7	351.0
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100).	218.8	219.3	236.7
Prices, domestic farm products (B.L.S., Aug., 1939 = 100)..	204.3	202.5	223.1
Prices finished steel composite (*Iron Age*, lb).....	3.837c	3.837c	3.708c
90 stocks, price index (Standard & Poor's Corp.).....	142.6	138.8	119.2

*Date of latest week for each series on request.

$502,197, equal to $1.78 a share of common, on sales of $6,292,511.

West Virginia Coal & Coke Corp. and subsidiaries—1949 net of $830,170, equal to $1.98 a share; 1948 net of $2,659,253, or $6.21 a share.

Boone County Coal Corp.—1949 net income of $104,779, equal to 87c a common share on sales of $2,413,093; 1948 net of $650,078, or $5.42 a share on sales of $3,272,549.

Westmoreland Coal Co.—1949 net of $605,476, equal to $4.03 each on 150,000 shares, on coal sales of $5,692,355; 1948 net of $1,086,100, equal to $7.76 on 139,000 shares, on coal sales of $6,916,325.

UMWA Welfare Fund Moves to Resume Payments

Trustees of the 1950 UMWA Welfare and Retirement Fund met in Washington April 5 to clear the way for the resumption of pension and other benefit payments to coal miners. Trustees of the new Fund are: Charles A. Owen, chairman of the board, Imperial Coal Co., representing the operators; John L. Lewis, representing the UMWA; and Miss Josephine Roche, director of the Fund, the neutral trustee.

Following the meeting, Miss Roche announced that trustees of the 1947 and 1950 Funds had executed legal papers necessary to the merger of the two Funds. This action, she said, "paves the way for the reactivation of the Welfare Fund," payments from which were suspended Sept. 17, 1949.

Earlier in the day, Sen. Bridges and Mr. Lewis, trustees of the 1947 Fund, had met and turned over to the 1950 Fund a reported $25 million remaining in the Fund and also dissolved the 1947 board of trustees.

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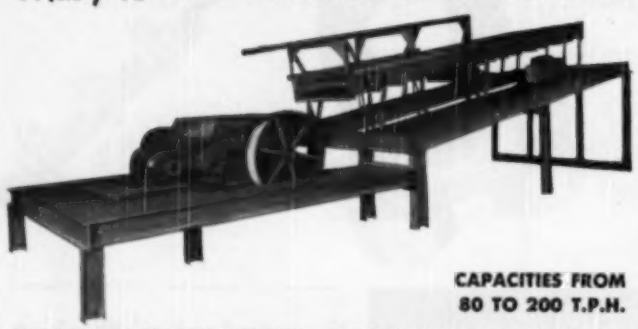

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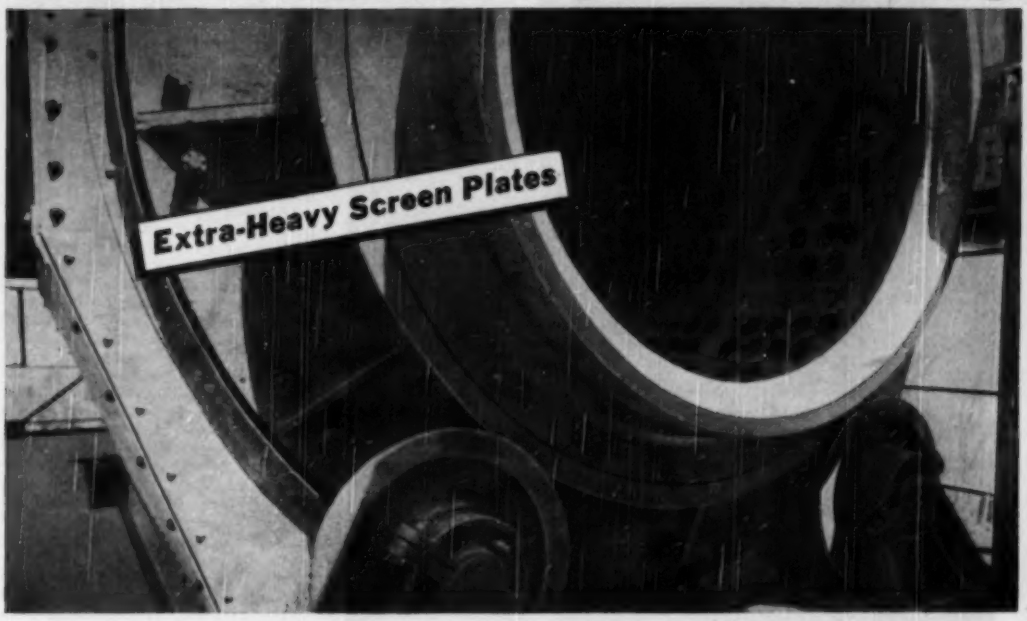
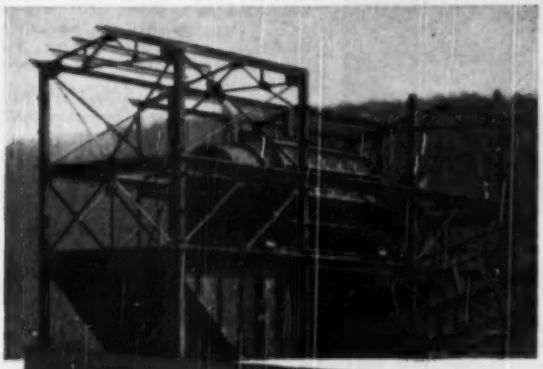


CONDITIONS COAL FOR CLEANING PLANTS



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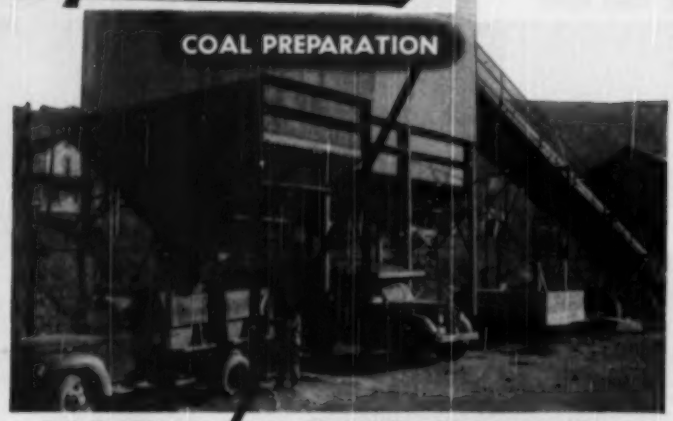
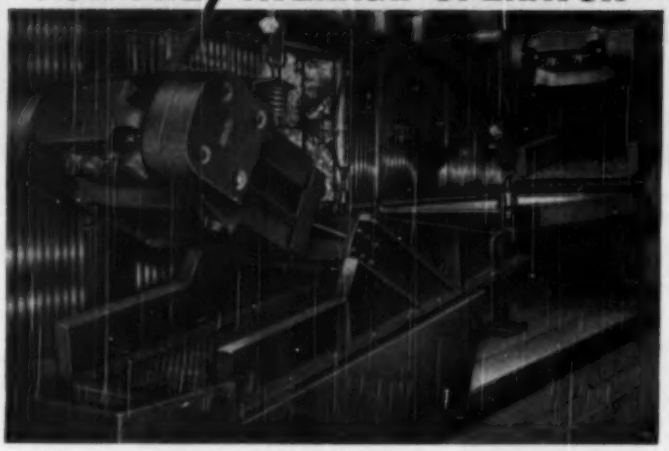


FOR THE AVERAGE OPERATOR



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Price Control for Coal Sought in Kilgore Bill

A bill creating a five-member Bituminous Coal Commission that would be authorized to set minimum and maximum prices for bituminous coal at the mines and to conduct a comprehensive investigation of the coal industry to determine legislation needed "to assure an ample supply of coal at all times" was introduced into the Senate April 10 by Sen. Harley M. Kilgore (D., W. Va.)

In proposing the measure, Sen. Kilgore said that it was needed to prevent a "riotous competitive price situation" in the coal mining industry. "There is a great excess of potential producing capacity over potential consumer demand for coal," he added. "This unhealthy situation, if permitted to continue unchecked, might easily lead to disastrous cut-throat practices in the industry. Both labor and management would suffer tremendously under such conditions."

Sen. Kilgore's bill is similar to the Guffey Act of 1937, with several major differences. Like the Guffey Act, it establishes the Commission under the Interior Department, with the help of 23 regional boards, to set prices for every grade of bituminous coal produced in the United States, the prices varying by producing districts and marketing areas. The minimum price structure in effect Aug. 23, 1943, would be the starting base and the Commission would make adjustments from that to conform with present price, producing-costs and marketing conditions, after mine owners had had a chance to submit data on these factors.

The Kilgore bill also creates a coal consumer's counsel to represent coal users before the Commission and other government agencies. It does not provide for production or allocation controls, but does permit the establishment of marketing agencies as existed under the old law.

The Guffey Act imposed a 20% excise tax on every ton of coal mined, with the government waiving 19½% for the operators complying with the law and using the other ½% to finance operation of the Act. The Kilgore bill provides no such penalty tax, but instead subjects violators to fines of $5,000 or 1-yr. imprisonment, or both. Operation of the Act is to be financed by a direct appropriation from the Treasury. The Kilgore bill also establishes a National Distributors Board to advise the Commission in setting coal prices. The Guffey Act provided for no such board.

The new bill also directs the Commission to conduct research programs for extending the use of coal, developing the most efficient mining, preparation and marketing methods and promoting the safe operation.

The Commission also is directed to conduct "a comprehensive investiga-

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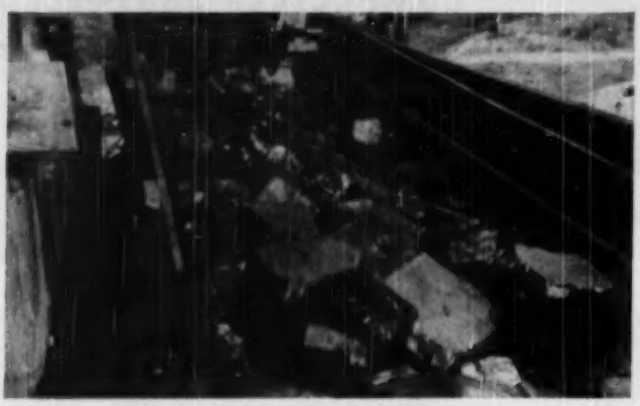

Photo Taken at Hockersmith Coal Co., Manchester, Ky.

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COAL MEN ON THE JOB

HELPING TO KEEP the overburden moving at George A. Yeatheimer's tractor-scraper strip mine near Punxsutawney, Pa., is the responsibility of Randall Miller (left), stripping foreman, and Elmer Doverspike, chief mechanic.

tion of the coal industry and shall transmit to the President and to Congress, not later than Dec. 31, 1952, its report concerning economic conditions in the coal industry, and its recommendations for such legislation as it may deem necessary or advisable to assure an ample supply of coal at all times to the consumers of the United States at fair and reasonable prices, produced and marketed by privately owned and managed industrial enterprise, with a minimum of public regulation, assistance and interference."

In its investigation, the Commission is directed to report on the following: (1) Production control through private cooperative action; (2) production control through allocation of producing; (3) production control through public purchase of coal-bearing lands and production facilities; (4) price stabilization through private cooperative action; (5) price stabilization through public subsidization of producers and distributors; and (6) price stabilization through public purchase of coal.

Sen. Kilgore's bill was referred to the senate committee on interior and insular affairs, but no action on it was immediately scheduled.

Natural-Gas Bill Vetoed by Truman

President Truman April 14 vetoed the Kerr bill, which would have barred the Federal Power Commission from regulating the production and gathering of natural gas by independent producers. Passage of the bill had been hotly contested in Congress and Mr. Truman's veto was quite unexpected. Several of the administration leaders in Congress were staunch supporters of the bill and it had been reported

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that they had been given to understand Mr. Truman would sign the measure.

In his veto message, Mr. Truman said that he believed the authority to regulate the sales of independent natural-gas producers was necessary "in the public interest" because of the inherent characteristics of the process of moving natural gas from the field to the consumer. "There is a clear possibility that competition will not be effective, at least in some cases, in holding prices to reasonable levels," he stated. The authority held by the FPC, he said, "will adequately protect the public interest by permitting the Commission to prevent unreasonable and excessive prices, which would give large windfall profits to gas producers, at the expense of the consumers." Experience may demonstrate the desirability of some improvement in the present Natural-Gas Act and he would not oppose "reasonable amendments if they are found to be needed," he added.

Since the bill was passed in the House by only two votes, no attempt to override the veto was expected.

Industry Officials Fight Oil Imports

A preliminary conference of representatives of coal and related industries met in Washington, April 13, to discuss a concerted drive to convince Congress of the damage being done to the nation by the increasing imports of foreign fuel oil. In addition to the officials of the various major coal associations, the meeting was attended by representatives of the independent oil industry, small business, railroads and labor unions.

In line with its objective of reducing imports of foreign oil by increasing the tariff on petroleum, the conference reportedly agreed that it would back any substantial bill in the House or Senate similar to the Gossett, Jenkins or Thomas bills, which are now pending in Congress. The Gossett bill, for example, would boost import duties from 10½¢ to $1.05 a barrel.

Earlier the same day, some members of the NCA Natural Resources Committee and others, headed by Dr. Charles J. Potter, president, Rochester & Pittsburgh Coal Co., and former Solid Fuels Administration, met with Secretary of the Interior Chapman to discuss the situation. The committee told Mr. Chapman that the coal industry was being "drowned in an increasing stream of foreign oil," it was reported. No promise of action was made by Mr. Chapman.

Following the meeting, Dr. Potter held a press conference, at which he told reporters that oil imports are displacing other fuels at a rate to force the layoff of 50,000 miners a year. Coal producers want imports restricted to 5% of the domestic de-

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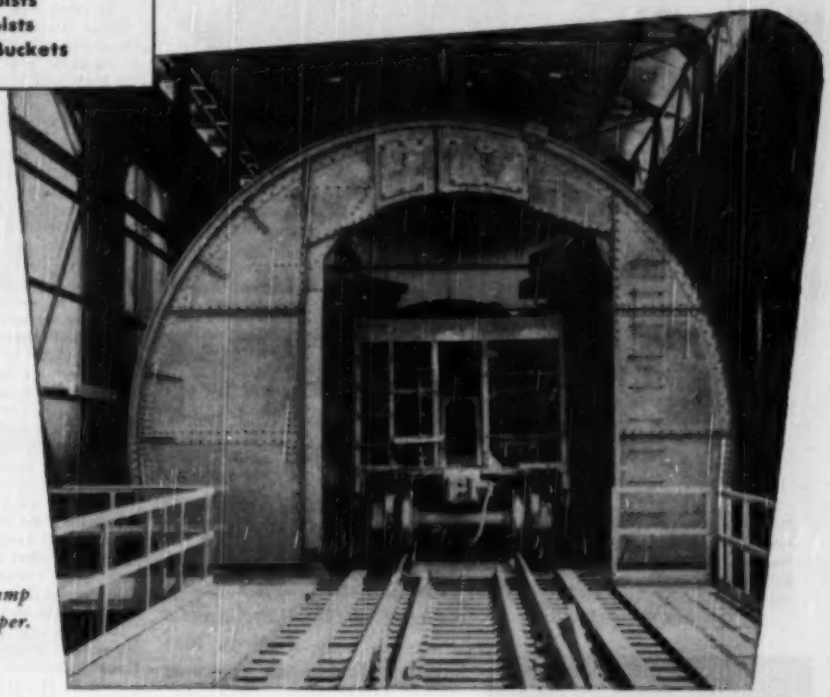

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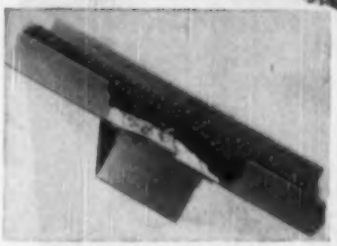

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mand, or about 300,000 bbl a day, he said. Most of the foreign oil being shipped in to the U. S. before it is refined contains 50% Bunker C, or residual oil, and these imports are displacing the equivalent of 25 million tons of coal a year, he pointed out.

Emphasizing that this oil has no military value to the U. S., Dr. Potter stated that it was being priced to take markets away from coal, with the price reduction being financed by refiners through increased gasoline prices.

"During the last war it took every bit of the oil we could produce in the U. S. and the coal industry was called on to take over what industrial load the oil industry had and to provide additional fuel," Dr. Potter said. "If we go into another war, with the railroads dieselized there will be no conversion to coal. Nobody knows how to burn coal in an internal combustion engine, as yet, so there will be no conversions of locomotives; there cannot be.

"There is another point with respect to national security. We required a lot of light oil products," he said. "There will be conflict between householders and the military as to oil. The only conversion we can make in the domestic market is through fireplaces, and that certainly doesn't heat the house; it simply augments the supply. So we will be called upon to take over the tremendous steam load that the oil industry had at that time. What are we going to produce it from?

"It takes a long time to build a coal mine. You can't build one overnight, but you can junk one in one night. Are we going to lose our labor force and lose these properties and then come along and have them say they need help from the coal industry? We will do all we can but we can't do that job. All the oil companies have done is to open up what really amounts to coal mines in Venezuela as far as we are concerned," he continued.

The first two of a series of regional meetings sponsored by the NCA to discuss the effects of foreign oil on the American fuel industries were held in Huntington and Beckley, W. Va., April 11 and 12, respectively. Representatives of the Kanawha, Logan, Williamson and Big Sandy groups attended the Huntington meeting, at which Harry Kennedy, secretary of the Kanawha Association, presided. Laurence E. Tierney Jr., president, Eastern Coal Corp., and a NCA vice president, presided at the Beckley meeting, attended by representatives from the Pocahontas, Winding Gulf, New River and Greenbrier groups.

Dan T. Buckley, assistant to the president, Castner, Curran & Bullitt, Inc., was the chief speaker at both meetings, outlining the seriousness of the foreign oil import situation and its impact on the entire coal economy. Robert E. Lee Hall, NCA counsel, also discussed the general legislative picture.

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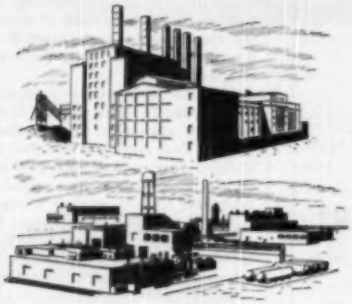

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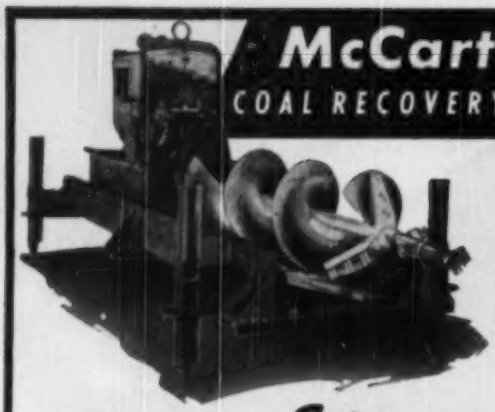

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UMWA Files Brief in Contempt-Case Appeal

A brief asking dismissal of the government's appeal from Judge Keech's decision clearing the union of civil contempt this winter was filed April 14 with the U. S. District Court of Appeals in Washington by Welly K. Hopkins, UMWA chief counsel.

It its brief, the union maintained that Judge Keech's decision was not appealable and it also argued that the government had not shown that Judge Keech had erred in finding that the Justice Department attorneys had failed to prove the union's non-compliance with the court order to end the strike. Arguments in the case were scheduled to be heard by the court April 26.

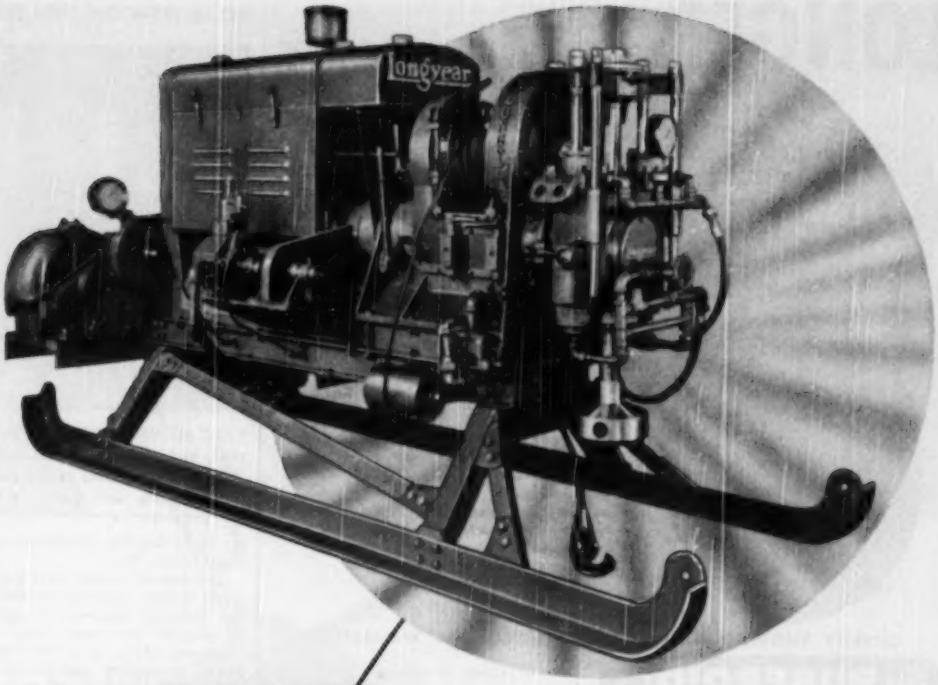
Mines Bureau Reports 1949 Achievements

The country moved appreciably closer to independence of foreign sources of oil last year when the U. S. Bureau of Mines opened demonstration plants producing gasoline, diesel fuel, fuel oil and other petroleum products from coal on a commercial scale, and solved the problem of mining oil shale at low cost, according to the annual report of James Boyd, director, to the Secretary of the Interior, Oscar L. Chapman. Among the many coal-mining activities of the Bureau covered in the report were its work in helping the industry achieve the lowest fatality rate in history and its experiments and research in the application of roof bolts for mine-roof support.

Notable progress was reported by the Bureau in other phases of its coal research activities, in petroleum research, fuel savings, mineral investigations to increase domestic supplies of essential minerals, metallurgical research, and in saving human lives through training of workers in accident prevention and first aid, and in making inspections of coal mines and offering safety recommendations.

In synthetic fuels—one of the most comprehensive research and demonstration programs of the Bureau—the results of years of investigations were incorporated in the coal-to-oil demonstration plant at Louisiana, Mo. The first of its kind in the United States, this plant has shown that liquid fuel can be produced from coal at high efficiency, although more expensively than from natural petroleum. Continuing research, the report adds, is expected to increase the efficiency and cut the costs still more.

At Rifle, Colo., by full mechanization, the Bureau reduced the cost of mining oil shale to a point that makes possible the economic use of the Nation's vast resources of this oil-bearing rock. There, too, the report notes, this country's first continuous-process shale-oil refinery went into operation, while laboratory studies of



Christopher Columbus ...mining field version

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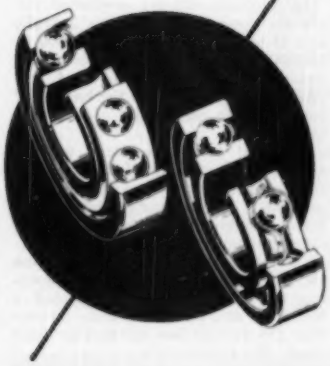

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COAL MEN ON THE JOB

P.&R.C.&I. SURVEYORS, Jay Williams (left), Harry Hale and Merl Jenkins, enter Porter Tunnel to extend lines to the face of this new opening, now over 2,900 ft long.

oil shale and its utilization continued at Laramie, Wyo.

The report reveals that the Bureau made further progress in determining the Nation's reserves of coking coal. It learned that some West Virginia coals not widely used for coking will yield acceptable metallurgical coke if suitably blended. Washability and screening tests showed that two more Illinois beds can produce clean coal suitable for metallurgical use. The Anthracite Research Laboratory at Schuylkill Haven, Pa., neared completion, paving the way for more intensive study of the mining, preparation and use of anthracite. At Grand Forks, N. D., construction began on the Lignite Research Laboratory, where efforts to extend the usefulness of this abundant but low-rank fuel will be stepped up.

Boiler-plant surveys conducted for various Government agencies brought annual operating savings of $1,600 to $54,000 a plant, the report discloses. Fundamental, background and applied research to reduce the hazard of explosions in mines and plants continued.

First-aid and mine-rescue courses again were emphasized in the Bureau's safety educational and training program. The number completing the accident-prevention course for mine safety committeemen increased markedly. Several thousand coal-mine supervisory officials and miners aspiring to become officials completed a broader accident-prevention course that the Bureau had tailored to their needs, the report said.

During the fiscal year, the coal-mine inspection program completed its seventh full year. Making 6,674 federal inspections of bituminous and anthracite mines, the report stated, brought the total number of inspections since the inception of the program to 25,000.

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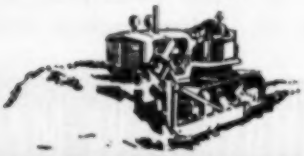

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Safety Training Complete At Consol (Ky.) Mine

The U. S. Bureau of Mines recently issued Training Certificate No. 3 to the Clover Splint mine, Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., certifying that 100% of its 318 employees had satisfactorily completed the Bureau's course in coal-mine accident prevention for miners.

The Clover Splint mine was the third mine in the nation, and the first in Kentucky, to receive such a certificate, it is reported. Employees attended 2-hr sessions two nights a week for a total of 10-hr instruction.

Association Activities

Northern Illinois Coal Trade Association re-elected all officers and directors at its annual meeting in Chicago March 22, as follows: president, M. M. Soule, vice president, United Electric Coal Cos.; vice president, William H. Cooke, president, Little Sister Coal Corp.; finance officer, T. C. Mullins, president, Northern Illinois Coal Corp. and Midland Electric Coal Corp.; and secretary, A. J. Christiansen. Named directors were: Chas. Shuler Jr., president, Alpha Coal Mine; G. Don Sullivan, assistant to the president, Fairview Collieries Corp.; B. E. Lundblad, vice president, Little John Coal Co.; H. M. Ziv, vice president, Walter Bledsoe & Co.; Harrison Eiteljorg, general manager, Morgan Mines, Inc.; R. H. May, vice president, Northern Illinois Coal Corp.; S. L. Jewell, Key Coal Co.; H. C. Mead, mine manager, The Pioneer Coal Co.; J. O. Westlund, vice president, Truax-Traer Coal Co.; and C. R. McElvain, president, Morris Coal & Mining Co.

Western Kentucky Coal Producers' Association has elected as president C. D. Glass, general manager, Pacific Coal Co., Mercer, Ky. William A. Borries, general manager, Dawson Daylight Coal Co. and Dawson Collieries, Inc., Dawson Springs, Ky., was elected secretary-treasurer of the association.

Utah Coal Operators' Association elected new officers April 5, as follows: president, Paul L. Shields, president, Spring Canyon Coal Co.; vice president, Walter F. Clarke, general manager, Independent Coal & Coke Co.; and executive secretary, B. P. Manley. Named to the board of directors, in addition to Messrs. Shields and Clarke, were: L. R. Weber, president, Liberty Fuel Co.; A. B. Foulger, general manager, Lion Corp.; A. P. Cederlof, general manager, Peerless Coal, Inc.; John Dorick, vice president, Hi-Heat Coal Co.; S. J. Craighead, vice president and general manager, U. S. Fuel Co.; and Claude P. Heiner, president, Utah Fuel Co.

Pocahontas Operators' Association, at its annual meeting in New York March 31 elected William Beury, president, Algoma Coal & Coke Co., president, to succeed the late O. L. Alexander. H. R. Hawthorne, president, Pocahontas Fuel Co., Inc., was named vice president, succeeding Mr. Beury. Other officers re-elected included: treasurer, H. F. Warden, president, American Coal Co.; secretary, W. E. E. Koepler; and assistant secretary-treasurer, B. B. Housman.

Foreign Developments

CANADA—Wage cuts from 75c to $1.86 per day for the 1,200 coal miners on Vancouver Island were requested by the Canadian Collieries (Dunsmuir), Ltd., during negotiations with the UMWA (CIO-CCL) in March. Competition is forcing prices below the average production costs and during the 8 mos ending Jan. 31 Vancouver Island mines lost 37c a ton on commercial coal, the company said. Oil, gas and other substitutes, as well as Alberta coal, are taking over many markets and the export markets have been lost, it maintained. The company also asked for elimination of free transportation to the mines, increased rentals for company-owned housing, changes in holiday pay and in the price of employee coal. The new daily wage rates proposed are: miners, $10, against the $10.75 formerly; haulage and mechanics helpers, $9, against $10.35; and unskilled $8, against $9.86.

In Nova Scotia, coal miners voted April 4 to sign a new wage agreement with the Dominion Steel & Coal Corp., Ltd., that provided for continuation of the previously basic daily wage rate of $8.14 for a 2-yr period. The vote was 3,401 to 3,223, with an estimated 68% of the membership voting. The company had countered the union's proposal for various wage hikes with requests for reductions as high as $1.50 a day, but it later agreed to maintain previous rates under a 2-yr contract. Formerly, the union had made only 1-yr agreements, but acceptance of the proposal was recommended by union officials.

Earlier, on March 27, Donald Gordon, president, Canadian National Railways, told the railway committee of the House of Commons in Montreal that the Maritime Provinces do not produce sufficient coal to meet the railroad's requirements. He reported-

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LOGAN . . . . WEST VIRGINIA

ly estimated that the CNR's Atlantic requirements would be about 1,000,000 tons more than the operators could supply in 1950. While his company is modernizing its system as rapidly as possible, he was not sure, he said, that dieselization of its locomotives was the complete answer to reducing overhead and showing better operating revenues. In Western Canada, Alberta fields appeared to be producing more coal than the system could use, he reported. A few days previously, Mr. Gordon had called on the Canadian coal industry to take more interest and push ahead on research on the more efficient utilization of coal by railways, or stand the chance of losing the CNR market. Diesels now are saving up to one-third the cost of coal on some jobs, he said.

In reply to Mr. Gordon, L. A. Forsyth, president, Dominion Coal Co., Ltd., said that his company would be glad to support such a program in association with the CNR or any other transportation system in the country. He said that his company already had under way a program looking to the future of the coal industry, a program that approaches the fundamental problems of improved quality and lower cost and contemplates capital expenditures in excess of $15,000,000.

On March 29, J. A. MacKinnon, Nova Scotia Minister of Mines, told the Nova Scotia legislature that the CNR had recently offered to buy 2,300,000 tons of Nova Scotia coal in 1950, but that operators could promise to supply only 1,120,000 tons, which is 300,000 tons more than normal. If operators could be assured of the 2,300,000-ton demand over a period of time, they could fill the order, he said.

Plans reportedly are being formulated in Ottawa and Frederickton to build a new coal washing and cleaning plant in the Minto coal field of New Brunswick, under the recently passed Maritime Coal Production Assistance Act that makes $10,000,000 available as loans for mine mechanization. Power expansion plans of the New Brunswick Electric Power Commission are said to call for an increase in coal demand from 200,000 to 400,000 tons annually. About 550,000 tons was produced in the Minto field last year.

AUSTRALIA — New South Wales coal miners have themselves to blame if they sometimes receive little more than the statutory minimum wage of $11.67 a week, says "Coal Fact," a booklet produced by the Joint Coal Board and mailed to the home of every mineworker.

At certain mines, some men are losing an average of $18 a fortnight through stoppages and absenteeism, and because of these causes New South Wales coal miners lost more than $4-million in wages and Australian industry was denied 2,500,000 tons of coal in 1949, the pamphlet states. Since there are about 18,000 coal miners in New South Wales, ac-

cording to the Coal Board's figures the average wage loss would amount to $222 a year per miner.

New South Wales black coal production, which accounts for about 80% of Australia's output, dropped to a new low of 10,732,000 tons in 1949. Statistics indicate that man-day production per miner dropped from 3.51 tons in 1938 to less than 3 tons in 1945, and has since stayed below that figure although mine mechanization has made considerable strides since the war.

ITALY—A loan of $3,413,000, equivalent to more than two billion lire, has just been authorized under the European Recovery Program, for machinery to expand production in the Sulcis coal field of Sardinia. The loan is being made to the Societa' Mineraria Carbonifera Sarda, owned by the Italian Government. The company itself will put into the mechanization and development of the property a sum sufficient to bring the total cost to more than six billion lire.

This program is designed to raise the production of Sulcis coal from a little more than a million tons in 1949 to approximately 3 million tons by 1953, virtual doubling of Italian production of solid fuels. It is expected that the coal will be produced with the new machinery at a price low enough to permit exports to steam power plants in North Africa. Previously, the coal, a highly volatile pitchy lignite, has been mined by inefficient hand-labor methods which resulted in a loss of about 2,000 lire on each ton sold in competition with imported coal. It is estimated that mechanization will cut the cost to the point where the coal will easily compete with that presently imported from England, Germany, Yugoslavia and Poland.

The mechanization program calls for the complete electrification of the Sulcis properties. Surface trolley locomotives will come from Italy and those for use underground from the U. S. Approximately $1,000,000 will go for U. S. loading and cutting machines, which are expected to raise production immediately from a little more than ½ ton a man-day to about 1½ tons a day. About $2,100,000 will be spent for coal-washing equipment, of which $1,000,000 will be spent in the U. S. and the rest in Europe.

GREECE — Fred Koper, Harry Evans and Paul Keim, representatives of Pierce Management, Inc., Scranton, Pa., left for Greece March 31 to initiate a program contracted with the company by the Greek government for the design and development of two lignite mines, with an annual capacity of 500,000 tons. The Pierce organization also recently announced that it has been named consultants by the government of Yugoslavia on the purchase of mining equipment totaling $12,000,000.

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Easy To Handle because it is pliable. Tuffy Draglines spool better and ride better on grooves.

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De Palau, S. A., and Nacional Financiera, S. A., reportedly has contracted with Pierce Management, Inc., Scranton, Pa., for the design of a completely mechanized coal-mining plant, including purchase and erection of equipment at an estimated cost of $3,200,000. A mine-management contract for three years also has been made.

The project is to be financed by a credit of $2,740,000, approval of which by the Export-Import Bank in Washington was announced last month. The credit is expected to be spent in the U. S. for materials and equipment. The new facilities are being built to supply steam and coking coal to the steel industry in Monclova and Monterrey in an effort to increase steel output there. Ultimate production is planned at 525,000 metric tons of coal a year.

Illinois Coal Hauler Switches to Diesels

The largest hauler of coal in Illinois, the Chicago & Eastern Illinois R.R., announced April 5 that it would replace the last of its coal-burning locomotives with diesel engines by May 15.

The line replaced the last of its steam-driven passenger locomotives Jan. 15 and presently had only six freight locomotives fueled with coal, the announcement said. Coal haulage is reported to represent about 20% of the line's total freight.

Preparation Facilities

Truax-Traer Coal Co., Fiatt mine, Fiatt, Ill.—Contract closed with McNally-Pittsburg Mfg. Co. for new raw-coal dumping, screening, breaking and conveying equipment to handle 1,250 tph of r-o-m coal, with all coal to be broken to 6¼ in with one McNally-Pittsburg heavy-duty rotary-type breaker; one additional 6-cell McNally - Norton automatic washer to be added to existing McNally-Pittsburg equipment to accommodate increased tonnage; water-handling and clarifying systems to be expanded to new tonnage rate; and all ¼x0-in washed coal to be dried in McNally - Carpenter centrifugal dryers.

Auburn Coal Co., Auburn, Schuylkill County, Pa.—Shipment by Deister Concentrator Co. of six SuperDuty Diagonal-Deck No. 7 coal-washing tables and one Concenco revolving feed distributor, for cleaning No. 4 anthracite buck.

DeBardeleben Coal Corp., Sipsey, Ala.—Shipment by Deister Concentrator Co. of two SuperDuty Diagonal-Deck No. 7 coal-washing tables, for cleaning ½x0-in coal.

Clear Fork Coal Co., Fonde, Ky.—

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*Teredo

We call our new core drill the "Teredo" because it will out-bore any other machine of its size. This light, compact, portable core drill will recover cores up to 2⅛" in diameter and operate at depths to 600'. It can be mounted on drag skids, jeep, truck or trailer; and powered by air motor, electric motor, gasoline or diesel engine or truck take-off. It's simple, rugged and relatively inexpensive.
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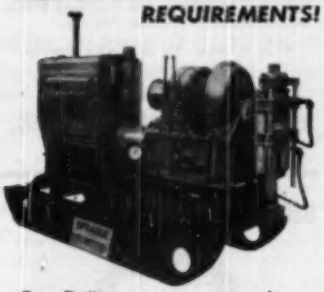

Core Drilling to *meet your needs*—that is a special advantage of Sprague & Henwood's Core Drilling Machines, designed to perform the work expected of them. They are modern in every respect . . . are engineered to meet the strenuous demands of present day core drilling jobs, . . . and construction enables them to withstand long, rugged service at high speed! Available with two distinct types of swivel-heads: "Screwfeed" and "Hydraulic".

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Shipment by Deister Concentrator Co. of two SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning ⅜x0-in coal.

Pompey Coal Co., Jessup, Pa.—Contract closed with Wilmot Engineering Co. for one 9-ft-diameter Hydrotator-Classifier for No. 5 coal; feed capacity, 25 tph.

Lehigh Navigation Coal Co., Lansford, Pa.—Contract closed with Wilmot Engineering Co. for one 6-ft-diameter Hydrotator for buckwheat No. 4 coal; feed capacity, 50 tph.

Colitz Coal Co., Pottsville, Pa.—Contract closed with Wilmot Engineering Co. for one 5-ft-diameter Hydrotator for No. 4 coal; feed capacity, 40 tph.

Lehigh Navigation Coal Co., Tamaqua, Pa.—Contract closed with Wilmot Engineering Co. for one 16-ft-diameter Hydrotator - Classifier for No. 5 coal; feed capacity, 65 tph.

Powell Coal Co., Kittann'ng, Pa.—Contract closed with Western Machinery Co. for one No. 3C Wemco Mobil-Mill to clean 60 tph of 4-inx10-mesh coal feed; including complete design and construction of an 80-tph cleaning plant, with the above as the central cleaning unit.

Halliday Boro Coal Co., Inc., Elkville, Ill.—Contract closed with Western Machinery Co. for one No. 3C Wemco Mobil-Mill utilizing a 7-ft-diameter Wemco cone separator, to clean 60 tph of 4x⅜-in. coal feed.

Buckeye Coal Co., Nemacolin mine, Nemacolin, Pa.—Contract closed with Nelson L. Davis Co. for Deister table equipment to handle ⅛x0-in coal from free-discharge launders at the rate of 32 tph. and froth-flotation plant to handle 48-meshx0-in coal at the rate of 45 tph.

Coal Publications

The following publications by the U. S. Bureau of Mines are available free upon request to Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are paper bound, mimeographed, 8x10½ in.

Conditions and Practices at Coal Mines in the Ruhr District of Western Germany, by J. B. Benson, H. E. Sanford and R. W. Stahl, I. C. 7459. 48 pp. plus illustrations. How Germans have handled difficult mining conditions and improved safety.

Historical Resume of Mine and Tunnel Ventilation Studies, 1910-1949, by G. E. McElroy. I. C. 7556. 16 pp. Summary and bibliography.

Coal for Coke Production, by A. C. Fieldner. I. C. 7559. 21 pp. Discussion of reserves of coking coal, possi-

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Abdul Abaa, Sudsula Sheik, states "Water is wonderful! It keeps the sheltering palms green, my dates in order, and suits my Camels to a T. After a long hard day on the desert, there's nothing like a tall, cool glass of water, the wetter, the better."

Dan Al Louis, Coal Dealer, disagrees. He says "Water clings to coal, causes it to clog up chutes and often freezes in transit. It's the Public Enemy No. 1 of the coal industry."

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ble methods of meeting a future shortage and progress in surveying overall coal reserves.

Shuttle-Car Conversion From Storage-Battery to Diesel-Electric Power, Acme Mine, Certain-Teed Products Corp., Acme, Hardeman County, Texas. U. S. Bureau of Mines, R. I. 4643. How conversion from storage-battery to diesel-electric power produced speedier and more economical shuttle-car haulage without objectional air contamination.

Synthetic Liquid Fuels: Annual Report of the Secretary of the Interior for 1949, Part I—Oil From Coal. U. S. Bureau of Mines, R. I. 4651. 62 pp. plus illustrations. Research and development, processing, operation of pilot and demonstration plants, cost estimates and bibliography.

The following are available as noted:

Handbook on Coal Sampling, by N. H. Snyder. U. S. Bureau of Mines, Revision of T. P. 133. 10 pp. 5¾x9-in; paper. 10c, Supt. of Documents, Government Printing Office, Washington 25, D. C. Revision of original materials on hand sampling plus new material on mechanical sampling.

Carbonizing Properties of Thick Freeport and Pittsburgh Coals from Pennsylvania, Elkhorn Coal from Kentucky, and America and Mary Lee Coals from Alabama, by J. D. Davis, D. A. Reynolds, B. W. Naugle, D. E. Wolfson, G. W. Birge, C. H. Flickinger and J. P. Graham. U. S. Bureau of Mines, T. P. 726. 58 pp. 5⅝x9-in; paper. 20c, Supt. of Documents, Government Printing Office, Washington 25, D. C. Plastic properties of each coal, plus yields and properties of carbonization products.

Transformer Principles and Practice (2d edition), by J. B. Gibbs. Westinghouse-McGraw-Hill "Engineering Books for Industry" series, McGraw-Hill Book Co., 330 West 42nd St., New York 18, N. Y. 232 pp. Cloth. $3.50. New edition adds a chapter on current-limiting reactors and many new illustrations. Construction and use, principles, applications, connections, testing, care and economics of transformers.

Best's Directory of Safety, First-Aid, Hygiene and Fire Protective Products (3d edition). Alfred M. Best Co., Inc., 75 Fulton St., New York 7, N. Y. 511 pp. 8½x11-in; boards; leatherette. $5. Catalogue of safety products and devices for every field of manufacturing. Equipment items are arranged according to hazards (for example, arm and hand, eye and face, fire). Illustrations and full index.

Manual of Electric Instruments (Revised Edition). General Electric Co., Schenectady 5, N. Y. 150 pp. $1. Fundamentals of construction and operating principles of all major types

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Allis-Chalmers HD-19 Tractor Service Manual. Allis-Chalmers Mfg. Co., Tractor Div. Service Dept., Box 512, Milwaukee 2, Wis. 287 pp. $5. Detailed description of construction and operation of the HD-19 tractor and its component assemblies, together with instructions for proper operation, maintenance, adjustment and repair.

Internal Auditing in Industry, by V. Z. Brink and Bradford Cadmus. Institute of Internal Auditors, 120 Wall St., New York 5, N. Y., 1950. 404 pp. 6¼x9¼-in; cloth. $5. Special problems of internal control and internal auditing of some representative industries, including coal and other mining, steel, petroleum, autos, banking, public utilities and others. Chapter on coal was prepared by a special committee.

Coal and Metal Mining. Quarterly of the Colorado School of Mines, Vol. 45 No. 2B. 381 pp. 6x9-in; paper. $3, Department of Publications, Golden, Colo. Fifteen papers read at the conference on coal and metal mining Sept. 30-Oct. 1, 1949. Coal-mining subjects include job opportunities, machines in western mines, economics and technique of stripping, continuous mining, coal beneficiation and synthetic liquid fuels.

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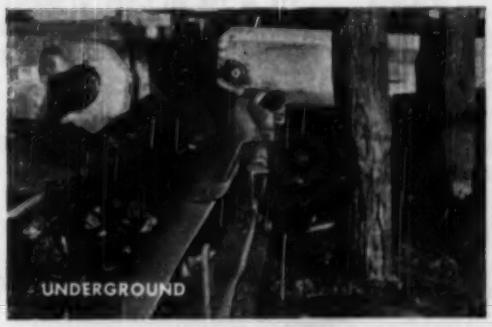

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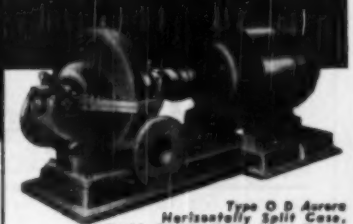

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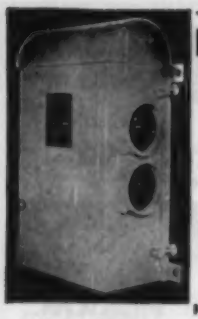

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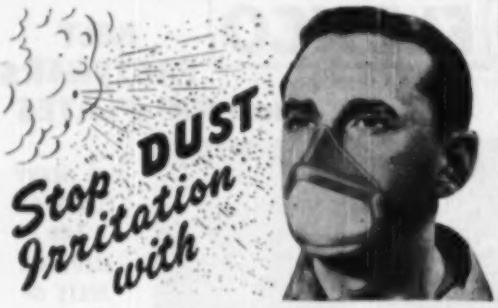

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3—333 KVA G-E 11000-2300/4000Y
3—333 KVA G-E 2400/4160Y-240/480
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3—200 KVA G-E 6600/11430Y-2300
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1—D-4400 Caterpillar Diesel Power Unit (less than 3000 hrs.) V-belted to a 30 KVA Fairbanks-Morse 220 volt, 3 phase Generator, complete with Exciter & Switchboard

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1—13 T G.E. 250 V. HM-827 44-36" Ga.
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1—5-Track McNally Pittsburg Steel Tipple complete with McNally Pittsburg No. 5 Washer, capacity 250 to 300 tons per hour.
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These Tipples and Washers are complete installations. Can be used for slope, drift, strip, or shaft mines.

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3—10-ton Westinghouse, Type 907C
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4—8-ton Westinghouse, Type 906C
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1	500	G. E.	1150	600
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2	175	G. E.	1200	275
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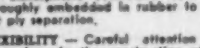

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10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	6	1/8"	1/16"	32 Oz.

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Complete with motor and drive.

15 to 25 ton per hour capacity ..... $ 350.00
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15 ton Truck Scales $450.00
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Single and double truck platforms.
Capacities 5 to 30 tons, $300 and up.

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Any length. Flights up to 6" x 24". All welded structural and sheet steel. Heavy duty, double guided chain. Prices from $400.00.

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Mounted on rubber tires and adjustable undercarriage. All welded structural and sheet steel; double guided heavy duty chain; steel flights to 6" x 24". Electric or gasoline power. Priced from $450.00.

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14" belt	$18.50	24" belt	$21.00
16" belt	19.00	30" belt	23.00
18" belt	20.00	36" belt	25.00
42" belt	$26.00		

1-roll Return Idlers for these sizes:

20" belt	$ 8.25	30" belt	$ 9.75
24" belt	9.00	42" belt	10.00
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150 KW Triumph 275 V. 600 RPM
150 G.E. 550 V. 1200 RPM
100 KW West. SK 275 V. 600 RPM
100 KW Delco 275 V. 1200 RPM

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HP		MAKE	TYPE	SPEED
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200		Westg.	SK-210	600
175		G. E.	MD	450
150		Westg.	SK	600
125		G. E.	CD	600
125		Century	drip. proof	1800
100		Westg.	SK-190	585
100		Westg.	S	525
75		G. E.	CDM	1150
60	NEW	G. E.	DC—splash proof	850
60	NEW	Westg.	SK-135	850

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200	Westg.	SK-210	900
150	Westg.	SK	600
110	Westg.	SK-190	700
100	Westg.	SK	720
100	Westg.	S	850
100	G. E.		900
75	Allis Chalmers		720
75	Westg.	S	850
75	Allis Chalmers		900
60	NEW G. E.	CD	1150
60	NEW Westg.	SK-135	1150

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KW	MAKE	RPM	VOLTS	TYPE
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200	Westg.	1200	2300/4160	AC Syn.
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100	Westg.	900	2300	AC Syn.
100	Delco	1200	220/440	AC Syn.

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3	150	West.	2400/4160Y	240/480
3	150	Peh.	2300	230/460
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1½" x 20 ft.	8.00 √	4" x 20 ft.	53.75
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But, experienced cattlemen and livestock buyers know that
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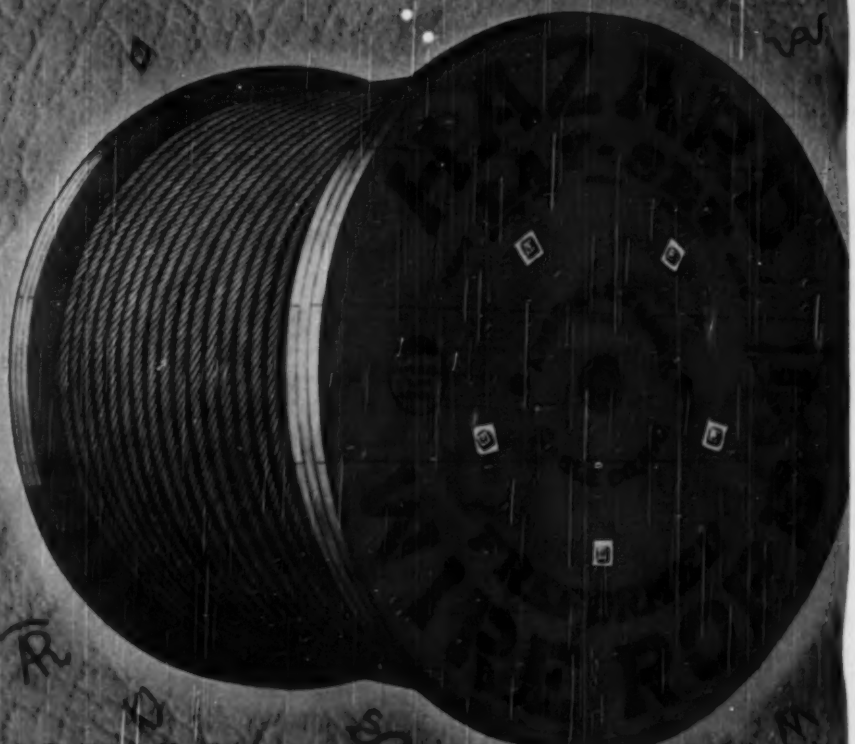

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TWO MILES IN ONE FLIGHT!

Here coal is prepared in this new blending and washing plant completely designed and built by Link-Belt. From this plant the washed coal is delivered to the tunnel belt conveyor (right side of above photograph) on which it is transported to the river and rail loading station.

River and rail loading station also built by Link-Belt Company where washed coal is loaded into barges, or by means of a by-pass conveyor, into railroad cars.

World's Longest Single Belt Conveyor

Through a mountain, under forests, roads and streams this single 30" wide belt conveyor transports coal from preparation plant to river and rail loading station—10,900 ft. from foot pulley to head pulley—more than four miles of belt operated by one drive!

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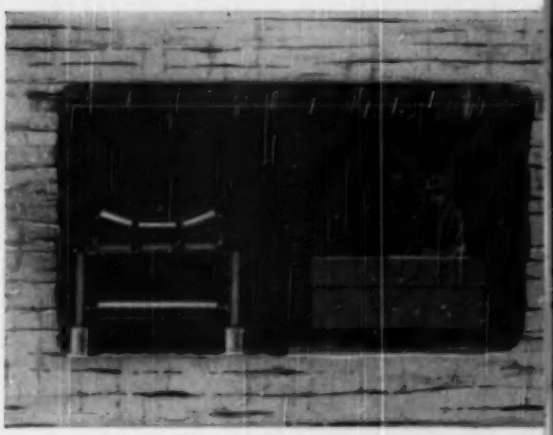

Typical cross-section through tunnel showing belt conveyor and battery driven patrol car. Standard Link-Belt type "100" idlers are used throughout the 2-mile long belt conveyor.

LINK-BELT COMPANY 11,544

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